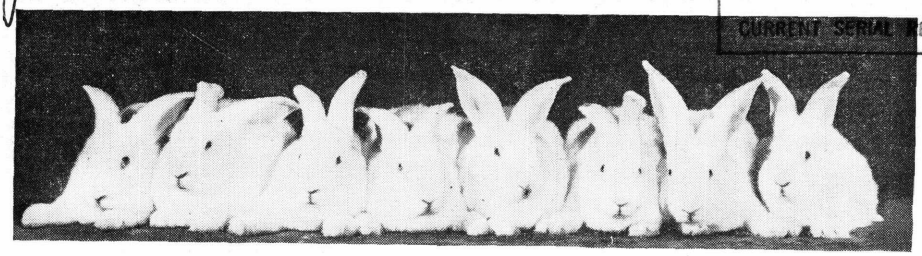
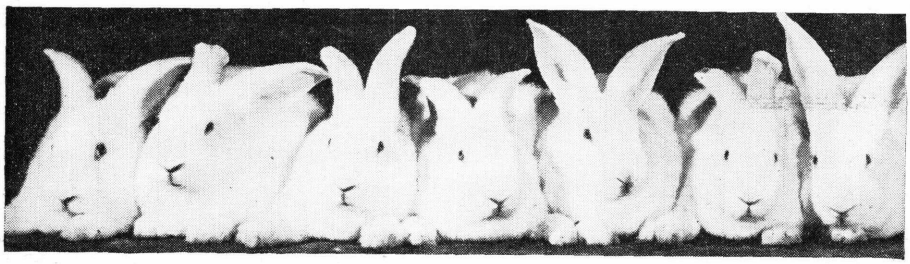


RAISING RABBITS



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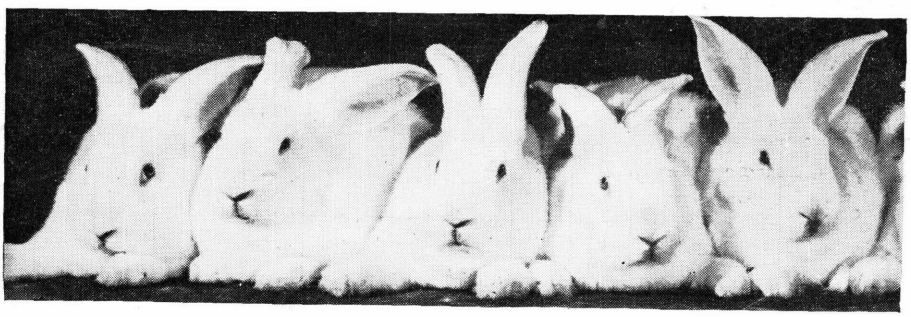

UNITED STATES DEPARTMENT OF AGRICULTURE

CONTENTS

Americans eat 50 to 60 million pounds of domestic rabbit meat each year and are asking for more. The rabbits come from small rabbitries with 3 or 4 hutches and from large commercial producers. Rabbit raising lends itself to both types of production.

Rabbits are excellent 4-H Club, Future Farmer, and Boy and Girl Scout projects. They make good pets. Rearing and breeding them is a popular hobby.

The recommendations in this bulletin are based largely on findings made at the United States Rabbit Experiment Station, maintained at Fontana, Calif., by the Animal Husbandry Research Division, Agricultural Research Service. At this station, improved methods are developed for producing rabbits with meat, fur, and wool of fine quality, for insuring sanitary surroundings, and for preventing outbreaks of parasitic and other diseases.

This bulletin supersedes Farmers' Bulletin 1730, Rabbit Production. It is being issued to answer the many thousands of requests for information about rabbits that are received each year by county agricultural agents, State colleges of agriculture, and the U.S. Department of Agriculture.

Washington, D.C.

Issued June 1959
Slightly revised July 1961

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington 25, D.C. - Price 20 cents

RAISING RABBITS

By GEORGE S. TEMPLETON,[1] director, U. S. Rabbit Experiment Station, Fontana, Calif., Animal Husbandry Research Division, Agricultural Research Service; and CHARLES E. KELLOGG,[2] consultant, Interdepartmental and International Relations, Agricultural Research Service.

Rabbit meat is palatable and nutritious. It is a convenient source of high-quality protein and has about the same food value as beef. It also is low in fat and caloric content.

Rabbit meat is pearly white and fine grained. It has a mild flavor.

All rabbitskins have some commercial value. Better grades of rabbitskins may be dressed, dyed, sheared, and made into fur garments and trimmings. Some skins are used without being sheared. Skins not suitable for garments are used for glove linings, for toys, and in making felt. Fine shreds of the flesh part of the dried skins left by separating the fur for making felt are used in making glue.

The price of skins varies from season to season and is influenced by the dictates of fashion.

The demand for rabbits for laboratory and biological purposes offers opportunities to breeders living near hospitals and laboratories. If you want to raise laboratory rabbits, first, find out from nearby city or county health offices, laboratories, and hospitals the type, age, and size of animals desired.

CHOOSING A BREED

Decide first whether you want to raise rabbits for meat and fur, wool, laboratory animals, or fancy stock—then select the breed best adapted to this choice. Mature animals of the smaller breeds weigh 3 to 4 pounds each; those of the larger breeds, 14 to 16 pounds. They also vary widely in color.

Rabbits best suited in size and conformation to producing meat and fur are such medium breeds weighing 9 to 12 pounds and larger breeds as New Zealand, Californian, American, Beveren, Champagne d'Argent, Chinchilla, and Flemish Giant. White breeds of rabbit are most desirable for commercial meat production because white skins usually bring higher prices. Preference among the white breeds is largely a matter of personal choice. Skins are a byproduct to meat production.

The American Rabbit Breeders Association lists standards for 66 different breeds and varieties of rabbits to cover breed characteristics such as type, color, and size. Disqualifications also are listed.

[1] Retired, January 31, 1957.
[2] Retired, October 31, 1960.

SELECTING FOUNDATION ANIMALS

When you use young rabbits for foundation stock, you have an opportunity to become acquainted with them and with their habits before they reach the production stage. Begin on a small scale, with 1 buck and 2 to 10 does, and expand operations as you gain experience and if market demands justify.

When buying breeding stock, deal directly with reliable breeders. Brokers handling live rabbits seldom are able to vouch for the conditions under which their animals were produced.

Reliable breeders stand behind the stock they offer and will give references. National, State, and local rabbit-breeders' organizations can furnish names and addresses of breeders from whom you can buy stock.

The United States Rabbit Experiment Station is purely a research agency and does not sell breeding stock.

The essential requirements of good foundation stock are: Health and vigor, longevity, ability to reproduce, and type and conformation consistent with ability to produce marketable offspring of the desired quality and size.

Angora rabbits are raised primarily for producing wool. Some breeders keep a few Angoras to produce wool for spinning yarn and knitting garments; others produce wool for the market. The animals are sheared, or plucked, every 10 to 11 weeks. An animal in a good commercial herd should average about 14 ounces of wool a year. The wool is unusually warm and light. When made into garments, it generally is combined with other fibers. It usually is too expensive and too light and fluffy to be used alone.

THE RABBITRY AND ITS EQUIPMENT

Select rabbitry equipment that is adapted to your local conditions and to your proposed operations by reviewing literature on the subject. If possible, visit rabbitries and discuss problems with successful breeders. Have your equipment ready when the first rabbits arrive.

The type of building you need for housing the hutches will be determined by local building regulations, climatic conditions, and by how much money you can invest. In planning your building and its equipment, emphasize comfort of the rabbits and convenience of the caretaker. The building should have a simple design, protect the rabbits from winds, rain, and bright sun, and provide for light and fresh air in the rabbitry.

Sunlight helps maintain a sanitary condition in the rabbitry but whether it helps the rabbits themselves has not been determined. Rabbits apparently enjoy being in it when temperatures are low or moderate. They must, however, be given a choice between sunlight and shade.

In mild climates, place the hutches in the shade of trees or buildings or under a lath superstructure. In areas where strong winds and stormy weather

prevail, you can put hutches in a building that is open to the south or east; use curtains or lath panels to close up the building during inclement weather. Where you have much cold weather more protection will be needed.

Hutches

Provide individual hutches for mature rabbits. The hutches should be no more than 2½ feet deep, so you can easily reach the rabbits, and 2 feet high. Make your hutches 3 feet long for small breeds, 4 feet for medium-size breeds, and 6 feet for giant breeds. All figures are for inside measurement.

Whether you arrange the hutches in single, double, or triple tiers depends on how much room you have. If you have enough room, waist-high, single-tier hutches are preferable; they are most convenient for observing and caring for rabbits. The two-tier arrangement uses space to good advantage and saves time in feeding and caring for the animals. Three-tier hutches, necessary when space is limited, are not entirely satisfactory for caring for and observing the animals in the bottom and top tiers.

Rabbits are more easily cared for in well-built hutches than in poorly constructed, temporary ones.

Self-cleaning hutches (figs. 1 and 2) need no bedding and you can easily keep them in good condition.

METAL HUTCHES.—Several designs of metal hutches are on the market. You can build your own metal hutches using welded wire mesh and sheet metal. A metal hutch that saves labor in caring for animals and is simply designed and economical to build is a combination two-compartment all-metal hutch.

WOODEN-FRAME WIRE HUTCHES.—Though not so durable as the all-metal hutch, the wooden hutch with woven-

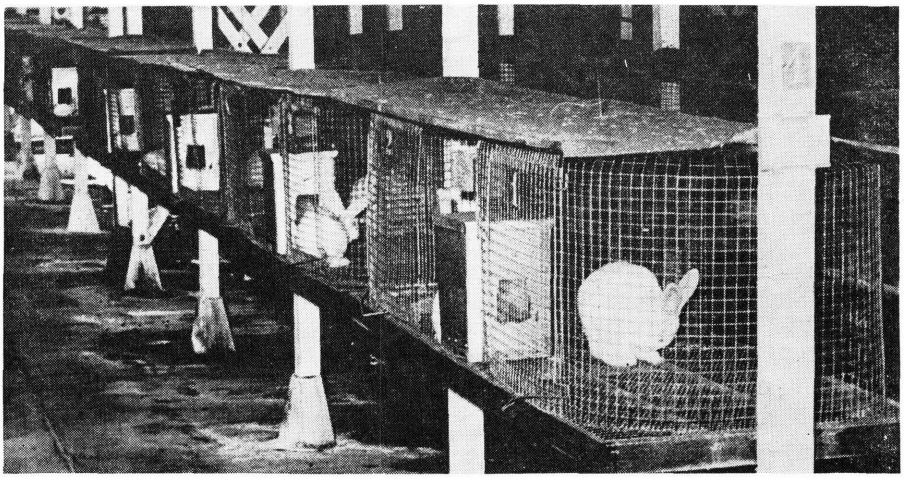

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***Figure 1.*—A rounded-corner hutch for rabbits.**

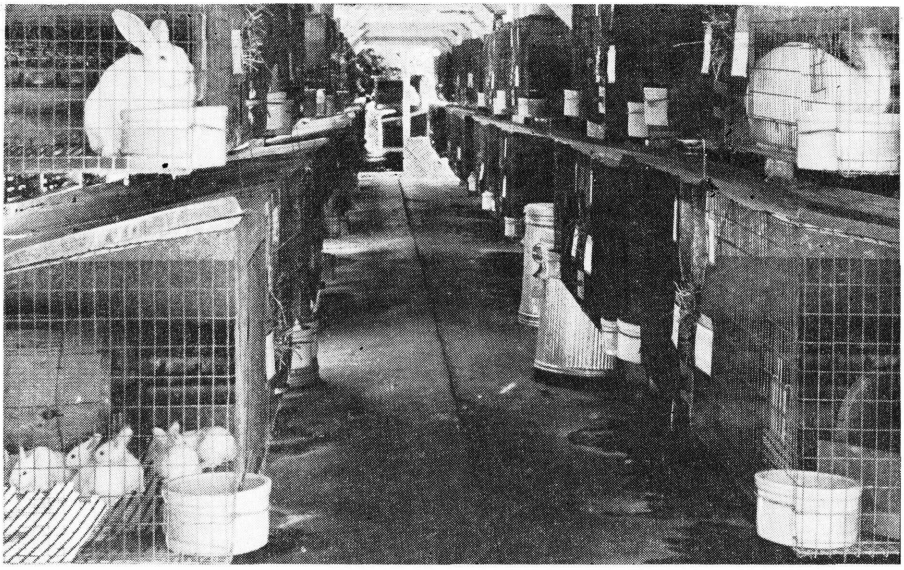

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***Figure 2.*—Two-tier metal hutches. The top hutches are set back 4 inches to prevent droppings from contaminating the lower ones.**

wire sides and ends permits good circulation of air. It is more sanitary than a solid hutch.

Hutches may be supported in several ways. If you use corner posts, make them long enough so that you can clean underneath and do other work around the hutch. You can support a hutch by resting it on a crosspiece nailed between the studs that support the shed or you can hang it from the rafters or ceiling of the shed with heavy wire or light lumber.

SEMIENCLOSED HUTCHES. — The semienclosed hutch is constructed with ends and back of wood (figs. 3 and 4). An extending roof gives added protection. You can use this hutch in outdoor rabbitries in colder climates.

Another satisfactory type of hutch, which is light, movable, and inexpensive, is shown in figure 5. You can place it under trees or on the protected side of a shed or building. A floor of hardware cloth is preferred to the narrow wooden slats shown; but, either floor allows the manure to fall through to the ground.

Rabbits kept in hutches made of wooden frames and wire need additional protection in cold climates.

HUTCH FLOORS.—Several types of floors are used in hutches, and each has its particular merit.

Wire mesh floors are used extensively where a self-cleaning type is desired. They are a necessity in commercial herds, where it would be impossible to provide enough labor to keep solid floors in a sanitary condition. The flooring can be of ½-inch mesh, 17-gage hardware cloth, for small breeds up to 6 pounds; ⅝-inch mesh, 17-gage hardware cloth, for

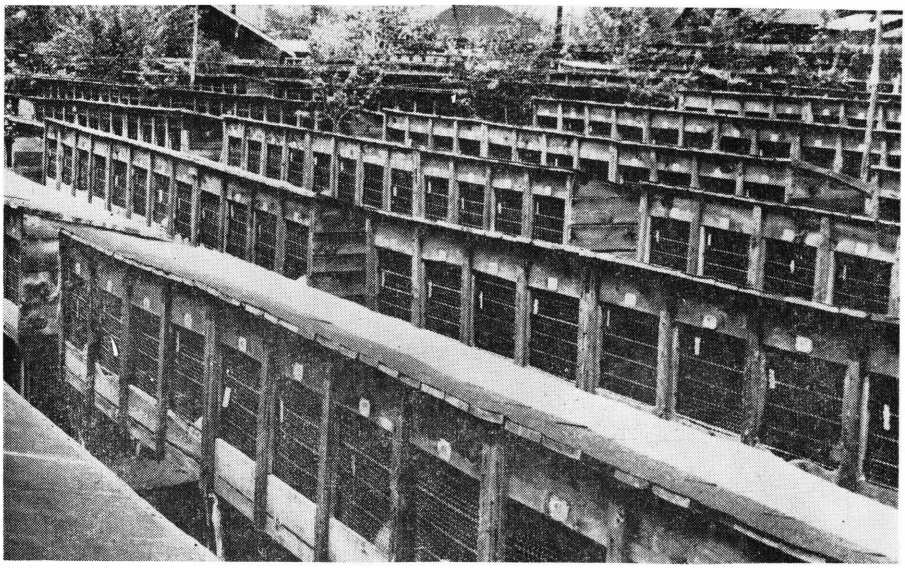

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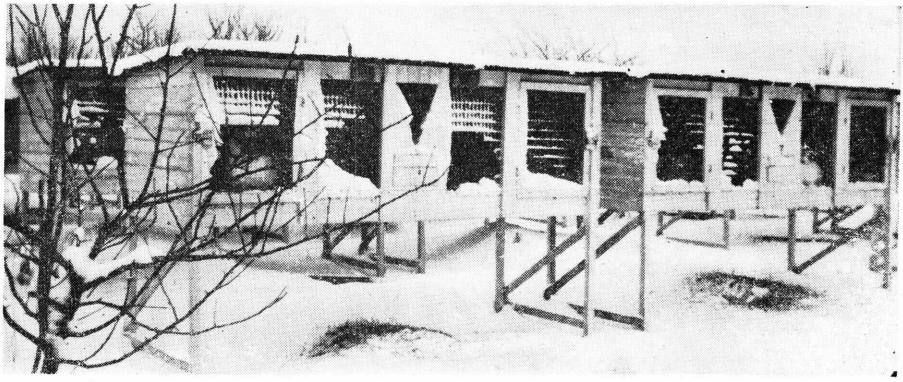
Figure 3.—**Outdoor hutches for Rocky Mountain States. Curtains are used in front row of hutches to break prevailing winds and to keep out rain and snow.**



11527–D

Figure 4.—**Outdoor hutches for Central States.**

medium breeds; and ¾-inch mesh, 17-gage hardware cloth, for the heavy breeds; or ½- by 1-inch, 16-gage mesh, for the small and mediumweight breeds; and ⅝- by 1-inch, 16-gage mesh, for the heavy breeds. It is important that the flooring material be galvanized *after welding;* otherwise, it will rust and require too frequent replacement.

In installing this type of floor, examine the surface for sharp points,

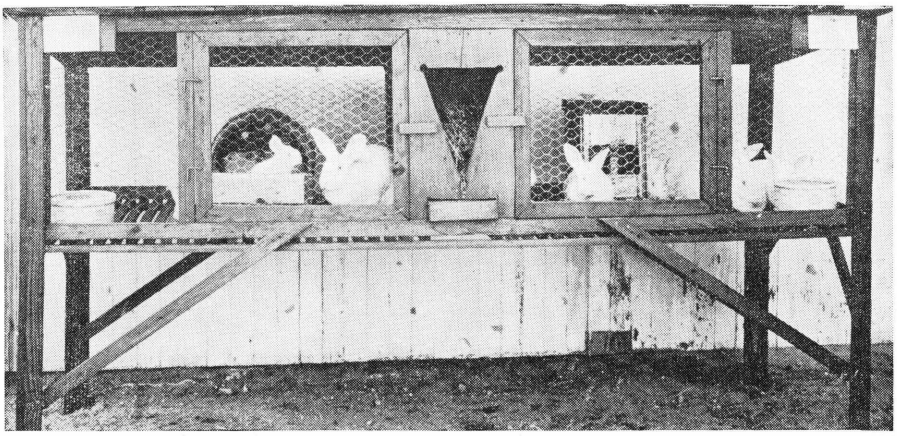


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***Figure 5.*—An economical hutch of light construction, which can be moved from place to place.**

which result sometimes from the galvanizing process. Always put the smooth surface on top.

Solid floors should slope slightly from the front of the hutch to the rear to provide proper drainage. You can use hardwood slats, 1 inch wide and spaced 5/8 or 3/4 inch. A combination of solid floor at the front part of the hutch and a strip of mesh wire or slats at the back may be used.

Feeding Equipment

Use feed crocks, troughs, hoppers, and hay mangers that are large enough to hold several feedings to save time in filling. Use a type that will prevent waste and contamination of the feed.

CROCKS.—Crocks especially designed for rabbit feeding, which are not easily tipped over, have a lip that prevents the animals from scratching out and wasting their feed. The chief objection to these is that the young rabbits get into them and contaminate the feed.

TROUGHS.—Troughs have an advantage in that they can be pulled out of the hutch for filling, cleaning, and disinfecting. Guards, placed on the feed troughs and spaced just far enough apart to permit a mature rabbit to feed, help keep the young ones out of the troughs and from contaminating the feed (fig. 6).

HOPPERS.—Feed hoppers of the proper design and size save considerable time and labor. They must be designed for a special type of feed. Use them with pregnant does, does with suckling litters, rabbits being conditioned for the market, and for developing juniors (when fed only alfalfa pellets).

A one-compartment feed hopper is used when only one kind of feed is given. When mixed feed that the rabbits can separate is offered in the hopper, the feed will be selectively consumed. The rabbits scratch out and waste the part they prefer not to eat at a given time. You can prevent this waste by using a hopper with individual compartments for each feed.

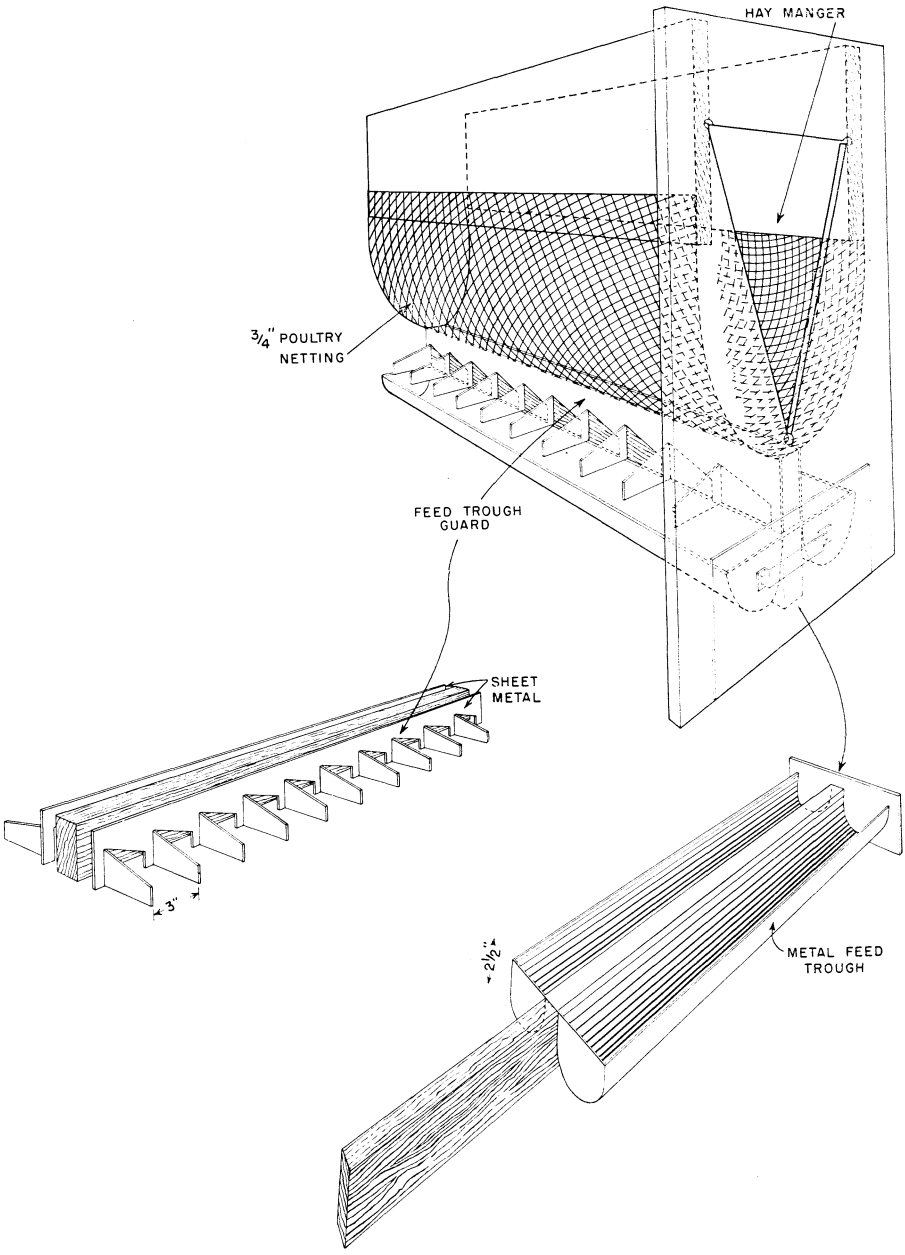

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***Figure 6.*—Feeding trough with guard and hay manger.**

You can make an inexpensive feed hopper that will hold about 15 pounds of pellets or grain from a common square 5-gallon can (fig. 7). First, cut off the top. Then cut holes in two opposite sides. The holes should be 4 inches high, 4 inches from the bottom, and 1 inch from each side. Bend the rough edges inward to give a smooth edge all around and to add rigidity. Take a 1″ x 4″ x 13½″ board, and cut it diagonally into two equal triangular pieces. Use these as supports to the baffle boards, which are nailed to them.

The baffle boards, of ¼-inch plywood, should extend 1 inch below the bottom of the side openings of the can. The space between the lower ends of the baffle boards permits the grain or pellets to flow down as the rabbits eat. Make the baffle boards to fit snugly against the sides of the can so feed cannot slip by. Round the top corners of the baffles so that each baffle will rest against the top edge of the can.

Cover with tin the exposed edges of boards that rabbits can gnaw. Put a finishing nail in the outer edge of the triangular piece supporting the baffle (fig. 7, *B*), and bend the nail to hook over the lower lip of the opening to hold it and the baffle in place. A piece of 11-gage galvanized wire with one end formed into an eye and the other into a hook can be fitted tightly around the can to prevent bulging (fig. 7, *A*).

You can save hutch floor space by using a hopper with a single feed opening and by placing the hopper only part way into the hutch. Cut an opening large enough to accommodate the hopper in the side of the hutch. Then wire the top of the hopper to the hutch for support. One short baffle on the side opposite the opening will keep feed out of the rear corners.

Make the feed hopper (fig. 7, *A*) into either a two- or four-compartment feed hopper by inserting partitions. Drive four small staples into each baffle board, two on each side of center, so placed as to serve as guides to the center partition (fig. 7, *B*). Nail narrow pieces of lumber to the edges of the triangular supports below the baffle boards to build them up flush with the surfaces of the baffle boards. This will keep feeds in the compartments from intermixing.

For a two-compartment feed hopper, insert only the wedge-shaped partition (fig. 7, *D*) between the baffle boards. When you use only this partition, fold a 1-inch strip of metal and place it over the narrow opening in the upper part of the partition to prevent intermixing of feed.

The two-compartment feed hopper can be made into a four-compartment one by inserting the other grooved partition at right angles to the one already in place (fig. 7, *E*). Having four separate compartments, each containing a different grain or pelleted protein supplement, prevents waste that otherwise would result as the animals scratch in search of different feeds.

Make a lid (fig. 7, *C*) of lumber, with projecting metal strips at each corner.

HAY MANGERS.—A convenient type of hay manger with a trough that prevents waste of hay is shown in figure 6.

Equipment for Watering

Rabbits should have clean, fresh water at all times.

CROCKS.—Half-gallon water crocks are used extensively. Fasten them in

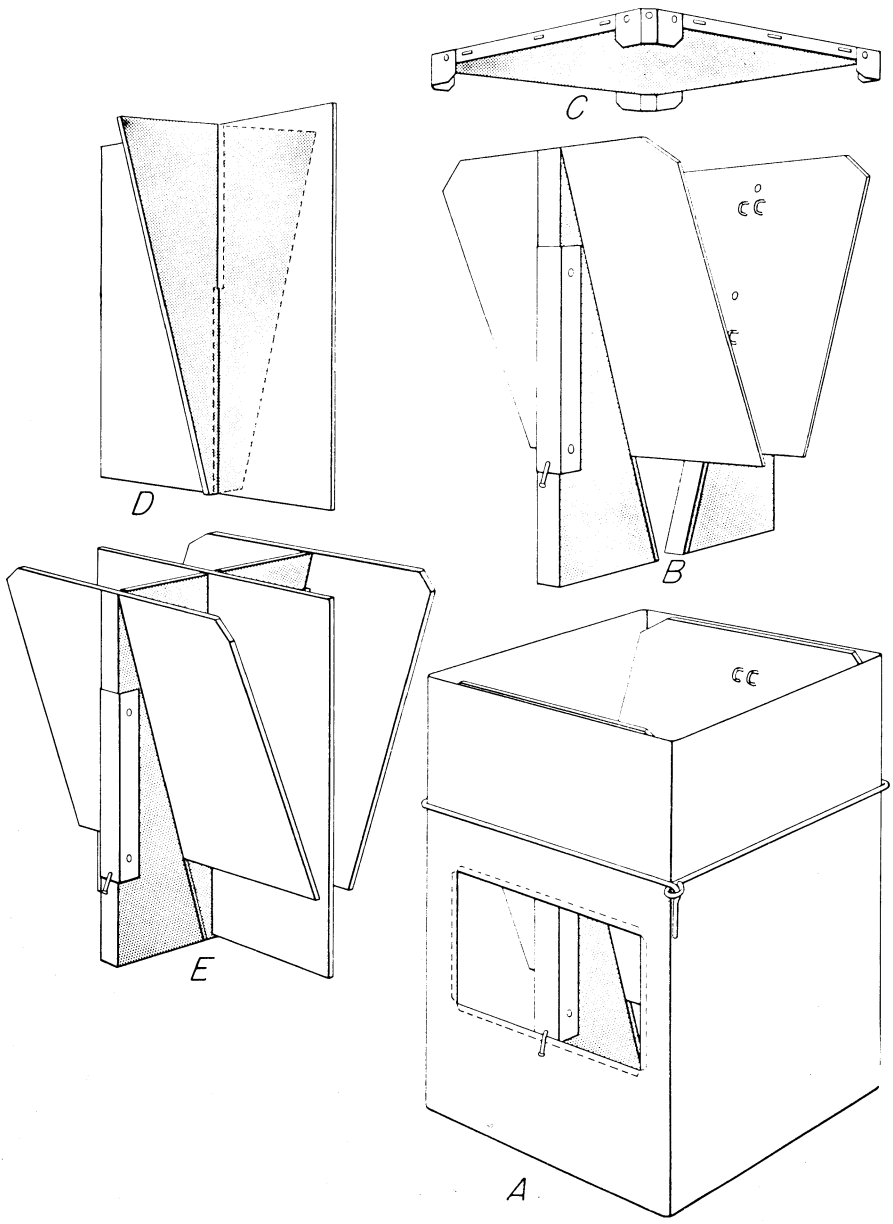

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Figure 7.—**Feeder made from a 5-gallon can. *A*, Feed hopper for one kind of feed. *B*, The two baffles withdrawn from the feed hopper. *C*, Lid. *D*, Double partition to fit between baffles of feed hopper to make it into hopper that will hold four feeds, one in each compartment. *E*, Assembled units (*B* and *D*) to insert in can to complete feed hopper.**

the hutches so that the rabbits will not tip them over. If a part of the crock extends through the front wall of the hutch, you can refill it without opening the hutch door (fig. 2). Clean and disinfect the crocks periodically.

COFFEE CANS.—Coffee cans are especially useful for watering rabbits during cold weather because you can easily break and remove ice. Cans are, however, easily tipped over unless you fasten them to a board.

AUTOMATIC WATERING SYSTEM.—Automatic watering systems are widely used in commercial rabbitries. They are better than water crocks or coffee cans. They eliminate the tedious and time-consuming chores of washing, disinfecting, rinsing, and filling. They supply fresh, clean water for the rabbits at all times. When an automatic watering system is properly installed, dirt and fur will not collect in it and plug it up. In cold climates, an automatic watering system must be protected against winter freezing unless the hutches are in a heated enclosure.

Rabbits learn to use the system readily. The young just out of the nest box will drink from the automatic valve as early as they will from a water crock (fig. 8).

If you can cut and thread pipe, you can install an automatic watering system. Conventional systems, sold by rabbit and poultry supply houses, consist of a break-pressure tank equipped with a float valve, a ½-inch supply pipe, a watering unit for each hutch, and valves. The valves are used to bleed out air bubbles, to drain the system as needed, or to shut off the water. If the water contains sediment, a half barrel can be advantageously used instead of the standard tank. The outlet for the supply pipe can be installed several inches above the bottom of the barrel. The sediment will then collect below the outlet pipe and will not get into the system and clog it. Other sediment traps, installed between the tank and the supply pipe to the hutches, can be used with any type of tank.

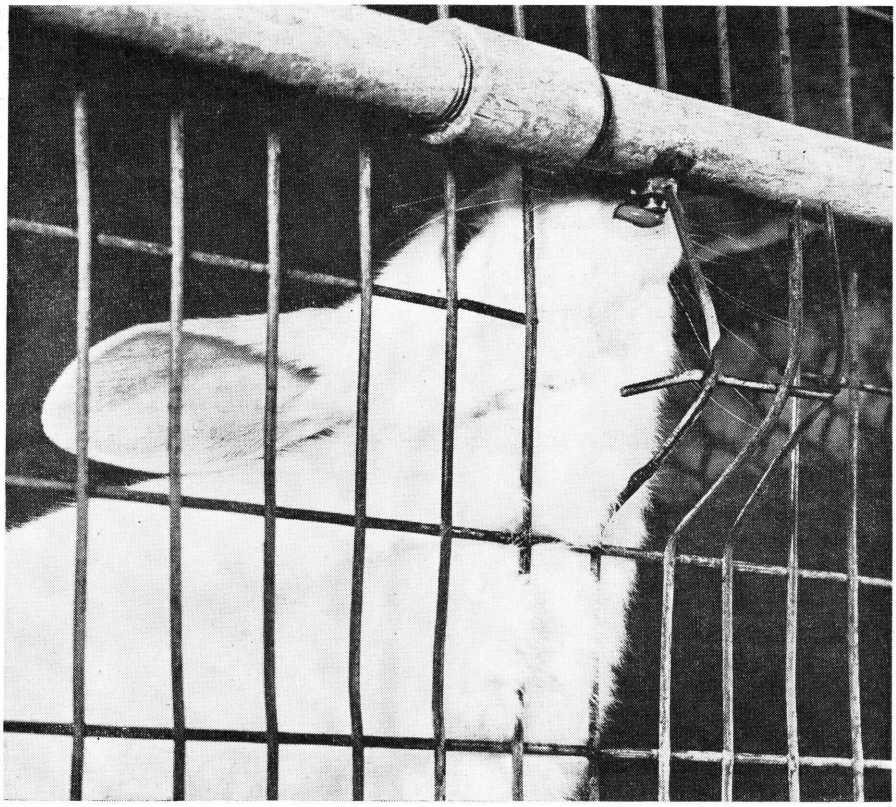
One-gallon tanks sometimes are used where the weather is warm. Such tanks are emptied more often. The constant flow of water in and out of the tank keeps fresh, cool water before the rabbits at all times.

Install the pressure tank 1 foot or more above the highest hutch. If the supply pipe is raised to clear feeding alleys, then install the tank about 1 foot above this highest point.

Raised supply pipes may require vent pipes to keep air bubbles out of the system. Install the vent pipe at the highest point in the supply line. See that the open end is at least 1 foot above the water level in the tank. If it is necessary to change the level of the supply line from one row of hutches to another, use a piece of rubber hose to make the connection.

Determine the correct height for the tank by fastening a rubber hose to the tank outlet and then to the supply pipe. Raise or lower the tank until the valves from which the rabbits drink have the proper tension. If there is too much tension or pressure on the valves, the rabbits will not be able to trip them. Under too little tension, the valves will drip.

The proper height for the water valve is 9 inches from the hutch floor for medium and heavy breeds and 7 inches for the smaller. Put the pipe on the outside and at the back of the hutch so no water drips on the rabbits and the hutch floor. An opening in the back of the hutch will permit the rabbit to use the valve.



12767–A

***Figure 8.*—Young rabbit drinking from an automatic waterer.**

When hutches are back to back use one pipe for supplying water to both hutches. Use a four-way outlet and short nipples for installing the valves.

You can install one drinking valve for each hutch by drilling and tapping the supply pipe and screwing the valve into it.

If you are not equipped to make the plumbing installation, substitute a ¾-inch rubber hose for the ½-inch supply pipe. Cut a hole in the hose and screw in the valve.

Check the automatic watering system periodically, especially when you put a rabbit in a hutch that has been unoccupied for several days. When valves are not used—even for a few days—minerals in the water may cause them to stick.

Nest Boxes

No one type of nest box is best suited for all conditions but all should provide seclusion for the doe at kindling—giving birth to young—and comfort and protection for the young. Nest boxes should be large enough to prevent crowding and small enough to keep the young together. All types

should also provide for good drainage and proper ventilation. Two general kinds are used extensively—the box type (fig. 9) and the nail-keg type (fig. 10).

Make the box type so the top and bottom can be removed during cleaning. The nail-keg box is inexpensive and easy to construct. A nail keg with metal end hoops is best. One with a head diameter of 13 inches is preferable for does weighing more than 12 pounds, 11½ inches for those weighing 8 to 12 pounds, and 10 inches for those weighing less than 8 pounds.

Losses of young rabbits kindled in winter largely can be prevented if you furnish proper nesting accommodations.

If a doe reacts normally to her new-

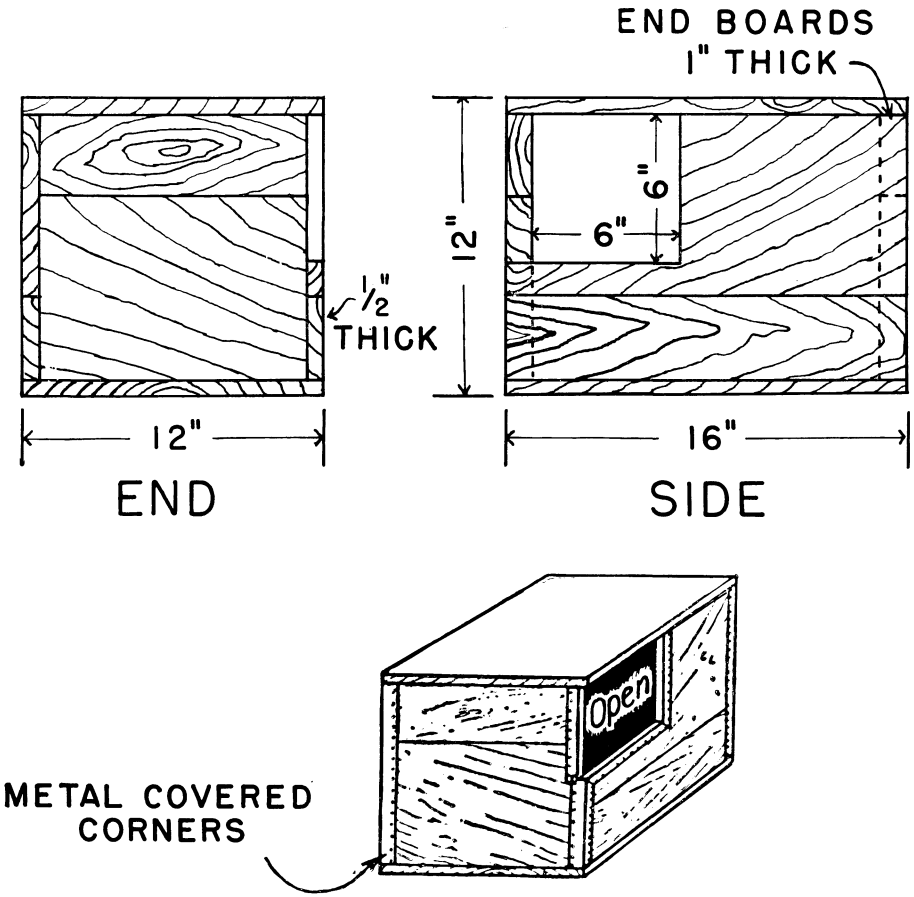


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Figure 9.—**Construction details for nest box.**

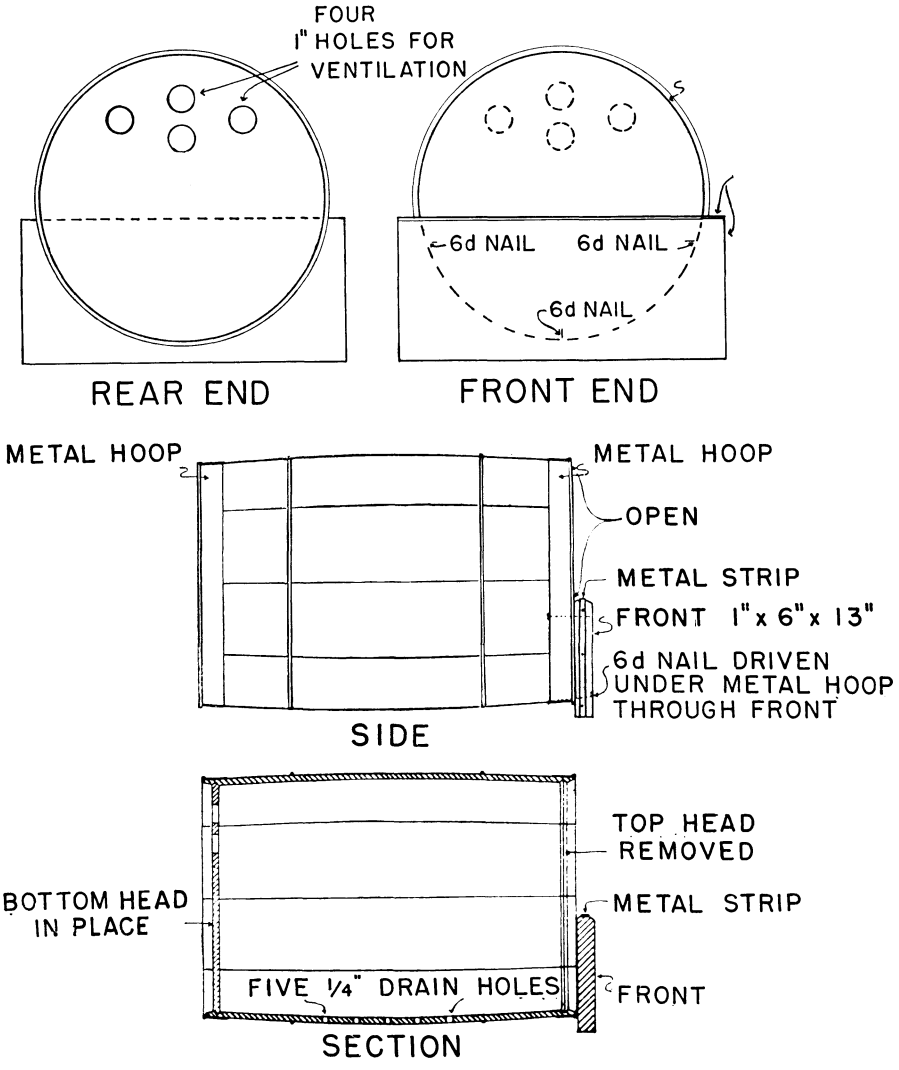

***Figure 10.*—Construction details for nail-keg nest box. Materials: One 100-pound nail keg, 1 board 1" x 6" x 13", 1 box strap ¼" x 24" or other metal strip, 3 6d box nails, 11 lath nails.**

born litter by pulling enough wool to make a warm nest and feeding her young, and if the nest box is well insulated, the young can survive temperatures as low as 15° to 20° F. below zero.

You can make a good type of winter nest box by placing a standard size nest

box (fig. 9) inside a larger box. Pack straw into the space of 3 inches or so on all sides except entrance and top.

A lid of ordinary box wood covered on the under side with two thicknesses of corrugated cardboard or several thicknesses of paper will supply the necessary top insulation. Make two or three holes, ½ to ¾ inch in diameter, in the end of this lid farthest from the opening to the nest box, for ventilation and to prevent condensation within the nest box.

On the bottom of the inner box, put one or two layers of corrugated cardboard or several thicknesses of paper to keep the newborn litter from coming in contact with the cold boards.

Fill the nest box so completely with new, clean straw that the doe will have to burrow into it to form a cavity for a nest.

Inspect the box daily for the first 3 or 4 days. If the cardboard or paper becomes damp from accumulated moisture, remove it promptly. Replace it if cold weather continues.

A simpler nest box for use in winter consists of a single box lined completely with 1 or 2 layers of corrugated cardboard and filled with straw.

FEEDS AND FEEDING

Success in raising rabbits is impossible if you do not give enough attention to rations.

To maintain a healthy herd, you must supply fresh, wholesome feeds in adequate quantity each day. Suit the feeds to the type of production in which you are engaged.

Feed is one of the biggest items of expense in raising rabbits. How much work you must do in feeding depends on the type of ration you choose. Each herd presents an individual problem. Select rations that are suited to the needs of particular rabbits, whether you buy commercially prepared mash mixtures or pellets, or mix feeds yourself.

Feed Requirements

Rations for dry does, herd bucks, and developing young should provide the following:

	Percent
Crude protein	12 to 15
Fat	2 to 3.5
Fiber	20 to 27
Nitrogen-free extract	43 to 47
Ash or mineral	5 to 6.5

Rations for pregnant does and does with litters should contain more protein. Their rations should include:

	Percent
Crude protein	16 to 20
Fat	3 to 5.5
Fiber	14 to 20
Nitrogen-free extract	44 to 50
Ash or mineral	4.5 to 6.5

The protein content of rations is important in development of young, for maintaining the breeding herd, and for wool production. It also is a factor in the quantity of food required for a certain gain in live weight. Adding the proper quantity of protein supplement to a ration composed of grains and hay increases the rate of growth of young rabbits 13 to 20 percent and effects a saving of 20 to 25 percent in the quantity of feed required for a unit of gain.

Protein is the most expensive part of the feed, but the proportions recommended are those that have proved most economical. The upper limits suggested give better results than the lower. *There is no danger in feeding higher levels of protein than recommended provided the ration is adequate in all other ingredients.* Thus, if your herd is small or if it would be difficult to feed two rations, you can give feed intended for pregnant does and for does with suckling litters to the entire herd.

Many rabbit raisers will have homegrown grains and hay or will be able to purchase them locally. These feeds in their natural form are satisfactory rations if you use additional protein to balance them properly. Feed in separate compartments of the self-feeder or use the plant-protein supplements—soybean, peanut, sesame, and linseed meals in the pea-size cake, flake, or pelleted form—with whole grain to make up the concentrate part of the ration. If you hand feed the mixture, use a container that prevents the rabbits from scratching out and wasting the feed. If you use finely ground mill products in the mixture, dampen the feed just before feeding to prevent the fine meals from settling out and being wasted.

Hay

For your rabbits, choose hay that is fine stemmed, leafy, green, well cured, and free from mildew or mold.

If you feed whole, coarse hay, a good deal will be wasted. The rabbits will pull a stem out of the hay manger, eat part of it, and drop the rest. To prevent some of this waste and to put the hay in a more convenient form for feeding, cut it into 3- or 4-inch lengths.

The legume hays such as alfalfa, clover, lespedeza, cowpea, vetch, kudzu, and peanut are palatable and make good feed for rabbits. The carbonaceous hays such as timothy and prairie, and hays made from Johnson grass, Sudan grass, Dallis grass, Rhodes grass, and carpetgrass, are less palatable than legume hays, but are valuable for feeding where legume hays are not readily available.

The grass hays ordinarily contain only about half as much protein as legume hays. When you feed them, include more protein supplement in the ration. If they are cut before the plants are in bloom, when the stems are fine and there is a high proportion of leaf, the grass hays are much more suitable for feeding. They have a higher protein content at this time but they never contain as much protein as legume hays.

Hays furnish bulk or fiber in addition to nutrients. Rabbits fed insufficient bulk have soft droppings that mash on the hutch floor and cause increased labor in keeping the hutch clean. They also may chew their fur. If you feed young rabbits too much bulk they will not get enough nutrients for rapid growth and market finish.

Green Feed and Root Crops

Rapid-growing plants—grasses, palatable weeds, cereal grains, and leafy garden vegetables free of insecticides—are high in vitamins, minerals, and proteins, and make excellent feeds, especially for the breeding herd. Use them in the ration when they fit into the management program.

Root crops, such as carrots, sweetpotatoes, turnips, mangels, beets, and Jerusalem artichokes, are desirable feed throughout the year and are particularly good in winter when green feeds are not available.

Fresh green feeds and root crops are supplements to the concentrate part of the ration. You will get best results when you use variety. Feed as much as the rabbits can eat in 4 or 5 minutes once a day. Fresh feeds contain 90 percent or more of water. Use them only as supplements to grain or pellets when producing choice carcasses. You can use them to maintain mature animals that are not in production.

Feed root crops and green feed sparingly to rabbits that are unaccustomed to them. There is no danger in feeding fresh green feed that is wet with dew or rain. Do not use feed that has been piled and become heated.

Place green feed in the hay manger; never throw it on the floor of the hutch. Contaminated feed may cause digestive disturbances or infest rabbits with internal parasites. Remove any feed that is not readily consumed.

Grains and Milled Feeds

Use oats, wheat, barley, the grain sorghums (milo, feterita, hegari, kafir, and sagrain), buckwheat, and rye as whole grains or as milled products. You can feed the softer varieties of corn whole, but there will be considerable waste of the flinty varieties unless you feed them in meal or cracked

form. The grains are quite similar in their food values and you can substitute one for another on a pound for pound basis without materially altering the nutritive value of the ration.

Milled-wheat products such as bran, middlings, shorts, and red-dog flour, and byproducts from manufacturing foods from other grains for human use may be included in mash mixtures and pellets.

Rabbits eat sunflower seeds readily, but because they have a much higher value for other uses they seldom are included in rabbit rations.

Miscellaneous Feeds

Dry bread and other table and kitchen waste (except meat and greasy or sour foods) are acceptable to most rabbits. When used as supplements to grain and roughage or pelleted rations, they add variety to the diet. When the cost is not prohibitive, cow's or goat's milk may be used in rations. If the milk is not sour or contaminated, it will not cause digestive troubles. Dry bread mixed with milk is a satisfactory feed for does with young litters and for rabbits being conditioned for shows.

Plant-Protein Feeds

Soybean, peanut, sesame, and linseed meals are rich in protein and desirable for balancing rabbit rations. These feeds in meal form are used in mashes and pelleted rations but are unsatisfactory for mixing with grains. They will settle out of the grain mixture and largely be wasted. The pea-size cake, the flake form, or the meals made into a pellet are satisfactory for use with the whole grains. If their protein content is the same, the meals in pea-size cake, flake, or pelleted form provide approximately the same nutritive value. Make your selection on availability and cost. Use fresh plant-protein supplement. You can tell it is fresh by its nutty odor and flavor.

Although soybean seeds have approximately 36 percent of protein and 18 percent of fat, the meal from the seeds, with fat extracted, has as much as 45 percent of protein and 1 to 5 percent of fat. If there is an oil mill nearby, you probably can exchange home-grown soybeans pound for pound for the meal. Rabbits do not eat the seeds readily—about 1 pound of them for each 10 pounds of grain. This proportion of soybeans will improve the protein content of a whole grain-legume hay ration slightly but not enough for maximum growth.

Salt

Salt is necessary in the ration. Put small blocks or salt spools in the hutch so the animals can feed at will, or add 0.5 percent of salt to mixed feed or pellets.

In areas where the soil is deficient in certain mineral elements, use mineralized salts fed other farm animals in rabbit rations.

Minerals and Vitamins

Little definite information is available concerning mineral and vitamin requirements of rabbits. Unquestionably, a mineral or a vitamin deficiency is less likely to occur if the animals are supplied with a wide variety of feeds that include two or more grains, a plant-protein supplement, a good-quality legume hay, green feed or root crops, and salt, for each supplies some of these elements.

Water

Rabbits need ready access to fresh, pure water at all times. In summer, they require large quantities; a 10- to 12-pound doe and her 8-week-old litter of 7 will drink about a gallon of water in 24 hours.

Pelleted Rations

Many brands of pelleted rations are on the market. Ingredients and proportions vary. Follow the advice of the manufacturer.

Pelleted rations require little storage space and are easily fed. In some localities they are the only rabbit feeds available.

There are two types of pelleted rations—the all-grain pellet to be fed with hay and the complete pellet (green pellet). The complete pellet usually contains all the food elements necessary for a balanced ration.

The choice between a home-mixed ration or a pelleted feed will depend on the availability and relative cost and how much time you have for preparing the ration and feeding the herd.

The following formula may be pelleted and used for feeding pregnant does and does with suckling litters:

	Pounds
Soybean meal, 44 percent of protein	18
Linseed meal, 38 percent of protein	4
Alfalfa meal, 15 percent of protein	40
Red wheat bran	15
Ground milo or barley	18.5
Ground oats	4
Salt	.5
	100.0

Pellets should be 3/16 inch in diameter and 1/8 inch long. If pellets are too large, small rabbits cannot get them in their mouths. The rabbits bite off a part of the pellet and drop the rest. The discarded part is lost through the self-cleaning hutch floor or is left to become contaminated on solid floors.

It is impractical for you to pellet your own rations.

Buying Commercial Feeds

Nearly all States have laws regulating the sale of commercial feeds. In most States the law requires that a tag giving the guaranteed analysis and a list of the ingredients be attached to the sack. Usually the percentages of protein and fat must be no less than is guaranteed. The percentage of fiber must not be greater. In some States nitrogen-free extract is not listed on the tag.

By studying the analyses of the various feeds as shown on the feed tags, you can select feed that comes nearest to meeting the requirements on page 17.

Preparing and Storing Feeds

Whole grains are satisfactory for feeding rabbits. Milled products, whether rolled, cracked, or ground, lose some of their food value and apparently become less palatable if stored for any length of time, especially during the summer.

Hay need not be cut unless it is coarse. Coarse hay is more convenient to feed and less wasteful if you cut it into 3- or 4-inch lengths. Cutting the hay you feed to Angoras helps keep the wool clean.

Sometimes you can save money by storing home-grown feed or feed purchased as it is harvested. Store it in rodent- and insect-proof containers.

Protect grains, pellets, hay, or other feeds and bedding materials from contamination by cats or dogs; otherwise the rabbits may become infested with the cat or dog tapeworm.

Frequency of Feeding

Whether a herd of rabbits should be fed 1, 2, or 3 times a day is largely a matter of personal preference and convenience. Regularity in feeding is more important than the number of feedings. Rabbits eat more at night than during the day, especially in warm weather.

Study the individual animal's food requirements and do not attempt to feed all in the herd alike. Some rabbits need slightly more than average, some a little less. Occasionally a rabbit goes "off feed." When this happens, reduce the quantity of the ration. The offer of a tempting morsel of carrot, bread and milk, or fresh green feed may induce the rabbit to begin eating again.

Methods of Feeding Grains and Pellets

Mixed whole grains and a protein supplement, or pellets, may be placed in standard rabbit feed crocks or feed troughs each day. This is called hand feeding. Or a quantity of feed may be placed in feed hoppers (see fig. 7) that have a separate compartment for each different feed and from which rabbits may feed at will. Such rabbits are said to be hopper fed. The hopper-feeding system saves time and labor, insures a more uniform quality of fryer rabbit, and prevents contamination and waste when the hopper is properly constructed.

You may feed rabbits restricted amounts or full feed (that is, feed all they will eat without waste). For full feeding in crocks or troughs, feed twice a day or more often; otherwise the animals will scratch out and waste feed. With a hopper, you can keep unlimited amounts of feed before the animals at all times.

Full feeding by hand produces about the same results as hopper feeding, provided you feed the animals all they will consume each day without waste. If you cannot give close attention, hopper feeding will give better results.

Full feeding insures rapid growth and economical development of young to weaning. Full-fed rabbits require less feed to produce each pound of live weight because they eat frequently and slowly and chew their food thoroughly.

Suggested Rations

The rations suggested in table 1 usually are available in the regions listed. You can substitute other grains or hays of the same type, pound for pound, without altering the nutritive value materially. Select linseed, soybean, sesame, or peanut meal containing 38 to 43 percent of protein.

Feeding Dry Does, Herd Bucks, and Junior Does and Bucks

You can maintain junior does and bucks, mature dry does, and herd bucks not in service but in good physical condition, on hay alone if you freely feed a fine-stemmed, leafy, green-colored, legume hay. If you feed coarse legume hays or carbonaceous hays, feed each

TABLE 1.—*Ingredients to use for mixing 100 pounds of rations in various regions*

Regions and ingredients	Dry does, herd bucks, and junior does and bucks	Pregnant does and does with suckling litters
ALL REGIONS [1]	*Pounds*	*Pounds*
Linseed, soybean, sesame, or peanut meal	8	20
Alfalfa, clover, vetch, or lespedeza hay	59. 5	39. 5
Salt	. 5	. 5
NORTHEASTERN STATES		
Oats	16	20
Wheat or barley	16	20
SOUTHEASTERN STATES		
Oats	11	14
Wheat	10	14
Milo, sagrain, or barley	11	12
CENTRAL STATES		
Wheat	16	20
Oats or barley	16	20
Or—		
Rolled oats	10	15
Rolled wheat or rolled barley	10	15
Cornmeal	12	10
NORTHWESTERN STATES		
Barley	16	20
Oats or wheat	16	20
SOUTHWESTERN STATES		
Barley, wheat, or oats	16	20
Milo, hegari, feterita, or kafir	16	20

[1] Add the ingredients listed under "All regions" to those listed under any of the individual regions.

8-pound animal 2 ounces (⅓ cup) of a grain-protein mixture or an all-grain pellet per day. For rabbits of other weights, adjust the quantity. Feed 3 ounces to a 12-pound animal.

Feed herd bucks in service the same quantity of concentrates and give them free access to choice hay.

An alfalfa pellet consisting of 99 percent of No. 2 leafy, or better grade, alfalfa meal (15 percent of protein) and 1 percent of salt may be full fed,

by hand or hopper, to developing junior does and bucks as the only feed from weaning until they are to be placed in the breeding herd. Take precautions to prevent juniors from becoming too fat if they are hopper fed some other types of rations.

Nutritive value of rations and daily feed requirements of individual rabbits vary. Note the condition of your individual rabbits and increase or decrease quantities to obtain desired physical condition.

Feeding Pregnant Does

To feed a doe properly, it is necessary to know definitely whether she has conceived. Palpating (feeling for the developing young in the uteri) is a quick and accurate method of determining pregnancy.[2]

After mating, maintain junior and mature does in breeding condition on good-quality hay until they conceive. If the doe fails to conceive as determined by palpation 14 days after breeding, breed her again and feed only hay until she conceives.

If you feed the herd a complete pelleted ration, each day from mating until you know she has conceived feed the doe only the quantity of pellets that will keep her in the desired breeding condition. Full feeding will cause her to put on too much flesh if she failed to conceive. When she has conceived, give her all the concentrates she will eat, in addition to good-quality hay, for the remainder of the gestation period. You can provide these concentrates in the form of grain and a protein pellet or all-grain pellets to supplement the hay. All-grain pellets have the necessary amount of plant-protein supplement incorporated with grain and salt to make a complete ration when fed with a good-quality hay. If you wish, you may feed pelleted complete feed.

Sudden changes in rations fed during the gestation period cause some does to go "off feed." If they fail to eat necessary nutrients for too long a period of time, abortion or young that are dead at birth may result. Gradually change over to the new ration by feeding ¼ new ration and ¾ old ration for 3 to 4 days, ½ new ration and ½ old ration for 3 to 4 days, and then ¾ new ration and ¼ old ration for 3 to 4 days.

Rabbits re-ingest part of their food, usually in the early morning, when they are unobserved. They re-ingest only the soft matter that has passed through the digestive tract. Investigators have called this trait "pseudo-rumination," from the characteristic of ruminants (cows, sheep, and others) of chewing the cud, which is food regurgitated and chewed again. Most rabbit breeders are unaware of this practice. Some that have observed it believe it indicates a nutritional deficiency. It is, however, normal in rabbits.

Feeding Does With Suckling Litters

After the doe kindles, she can be fed in the same manner as before until the young are weaned when about 2

[2] See Leaflet 245, Palpating Domestic Rabbits to Determine Pregnancy, U. S. Department of Agriculture.

months old. From the day of kindling, feed her all she readily will consume without waste of a grain-protein mixture and hay, an all-grain pellet and hay, or a complete pelleted ration. As the litter develops, feed the doe and litter greater quantities.

When the doe kindles, you can provide a feed hopper (see p. 11). If the hutch is small (less than 10 square feet of floor space for a 10- to 12-pound doe), placing a hopper in it with the nest box would make it too crowded. Full feed the doe by hand until the nest box is removed, then introduce the hopper. Inspect the hopper occasionally to make sure that feed is always available.

BREEDING

Germ Cells and Fertilization

In the rabbit, several egg cells usually are released at one time, and the size of the litter is determined by the number that mature, are fertilized at a given period, and develop to birth. The rabbit differs from many other animals in that the act or excitement of breeding is required to cause eggs to be released. Reproduction begins when egg cells are fertilized by the sperm cells. Fertilized eggs become attached to the walls of the uterus, where they develop.

At each mating a vigorous normal buck deposits many thousands of sperm cells, which are much smaller than the eggs. The excessive number produced is a provision by nature to insure fertilization, for only 1 sperm cell unites with 1 egg cell. Consequently, more than one service to supply additional sperm cells is not necessary. Two or more services will not overcome a difficulty that prevents conception. There is, also, a distinct disadvantage in allowing more than one service. Excessive use lowers the buck's vitality.

Age to Breed

The proper age of bucks and does for the first mating depends on breed and individual development. Smaller breeds develop more rapidly and are sexually mature at a much younger age than mediumweight or giant breeds. Mate does when coming into maturity; some difficulty may be experienced if mating is too long delayed. On the average, the smaller breeds may be bred when the bucks and does are 4 to 5 months old, the mediumweight breeds at 5 to 6 months, and the giant breeds at 9 to 12 months. Some individual rabbits within a breed develop more rapidly than others. In determining the proper time for the first mating, maturity of the individual is more important than age.

Gestation Period

The gestation period, or the period from mating to kindling, is 31 or 32 days. Some litters may be kindled as early as the 29th day or as late as the 35th, but 98 percent of the normal litters will be kindled between the 30th and 33d day. If kindling is delayed 2 or 3 days, generally one or more of the fetuses is unusually large.

Breeding Schedule

The breeding schedule you should follow is determined by the type of production. It probably would be better not to attempt to produce more than 2 or 3 litters a year in raising animals for show purposes. Arrange time of matings so that the offspring will be of proper age and development for the show classification. In commercial production for meat and fur, work breeding animals throughout the year if possible. Space matings to distribute the workload at kindling.

With a gestation period of 31 or 32 days and a nursing period of 8 weeks, a doe can produce 4 litters in a 12-month period if no failures, or "passes," occur.

Where extreme temperatures make it undesirable to have litters kindled during 2 or 3 months of the year, does may be rebred 42 days after kindling

and still produce 4 litters. Does of heavy-producing strains can be mated 6 weeks after kindling, and if no failures occur will produce 5 litters in a year.

If a doe is full fed a properly balanced ration during the suckling period, she should be in condition for breeding when the litter is weaned. If, however, upon weaning the litter the doe is not in good physical condition, she should be allowed to rest until she is. If the litter is lost at kindling, or the size of the litter is materially reduced for other reasons, and the doe is in good condition, she may be rebred earlier than called for by the regular schedule, but not earlier than 3 or 4 days after kindling.

Factors That Limit Conception

Among the causes of failure to conceive are sterility and false pregnancy. Factors that result in a low percentage of conception include extreme age, poor physical condition, sore hocks, injuries, and disease. For additional information on the last three factors, write to the Agricultural Research Service, U. S. Department of Agriculture, Washington 25, D. C.

STERILITY.—Early spring is the normal breeding season for the rabbit. The percentage of conceptions is higher at this time of year than at others and drops materially during the fall.

Extreme temperatures, especially sudden changes to high temperatures, may cause the rabbits to go into a barren period that will continue for some time. The ovaries of the does become inactive during the barren period, fail to produce normal egg cells, and occasionally shrivel. Where the bucks are not settling the does, the sperm cells may be inactive or absent.

Individual rabbits vary markedly as to duration of the barren period. Does and bucks in some herds are fertile throughout the year for successive years. Other herds go through periods of 4, 8, or 10 weeks when the does will not conceive. Extreme cases in which no young are produced for 4 to 5 months may occur in herds that are out of condition because the ration has been inadequate in quality or quantity, or both. If the herd has been properly cared for, most bucks and does should complete the barren period in 4 to 6 weeks.

Because does and bucks vary so much with respect to breeding, you may well consider this factor carefully. In selecting breeding stock, make your choice from offspring of parents that produce regularly.

FALSE PREGNANCY.—Does may be mated or stimulated sexually and shed the egg cells, yet fail to become pregnant. False pregnancy may be caused by an infertile mating or sexual excitement when one doe rides another. Whether riding or ridden, does may become "false pregnant" and be unable to conceive until the false-pregnancy period, which lasts 17 days, is over. After 18 to 22 days, the doe may give evidence of the termination of false pregnancy by pulling fur and attempting to make a nest.

Separate does that are to be mated and put each in an individual hutch 18 days before mating. They will have passed through any false-pregnancy period by mating time.

AGE.—Young does may not be sexually mature at the time of service, and old does may have passed their period of usefulness and fail to conceive. Do

not attempt the first mating until the does are sexually mature and properly developed; the proper age is discussed on page 25.

Does should reproduce satisfactorily as long as they maintain good physical condition and satisfactorily nurse their litters. Retain them if younger and better stock is not available for replacements. In commercial herds, does that are properly cared for should produce litters until they are 2½ to 3 years old. An occasional individual rabbit may reproduce satisfactorily 4 to 6 years.

PHYSICAL CONDITION.—Rabbits that go "off feed," go into a prolonged or heavy molt, become abnormally fat or thin, or become out of condition for any reason, will have their reproductive powers impaired materially. The percentage that will conceive will be low, since they may become temporarily sterile.

Never mate rabbits when they show any symptoms of disease. Remove such animals from the herd and hold them in quarantine until they completely recover.

MANAGING THE HERD

Success in raising rabbits depends on efficient management. Become thoroughly acquainted with your animals—their characteristics and behavior, their likes and dislikes. Consideration for the welfare of animals is always necessary for success in raising them. Proper arrangement of equipment, hutches, and buildings is also essential to efficient management.

When you enter the rabbitry, do it quietly and make your presence known by speaking in a low tone. Caution others to do the same. Otherwise, the rabbits may become frightened, race around in the hutch and injure themselves, or jump into the nest boxes and injure the litters.

Methods of Handling Rabbits

Never lift rabbits by the ears or the legs. Handling in this manner may injure them.

You can lift and comfortably carry fryer or small rabbits by grasping the loin region gently and firmly. Put the heel of the hand toward the tail of the animal. This method prevents bruising the carcass or damaging the pelt.

To lift and carry a mediumweight rabbit, let the right hand grasp the fold of skin over the rabbit's shoulder. Support the rabbit by placing the left hand under his rump (fig. 11).

Lift and carry heavier rabbits in a similar manner. If the rabbit scratches and struggles, hold him snugly under the left arm.

Making Matings

Does give evidence of being ready for mating by restlessness, nervousness, and efforts to join other rabbits in nearby hutches, and by rubbing the chin on feed mangers and water crocks.

Breed a large number of does at one time to make fryers available at a certain season for the trade, or space breeding to produce a constant supply. Always take the doe to the buck's hutch for service. You may

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***Figure 11.*—How to lift a mediumweight rabbit. (Courtesy of Small Stock Magazine.)**

have difficulty in service if you take the buck to the doe. The doe is likely to object to having another rabbit in her hutch and may savagely attack and injure the buck. Some bucks are slow in performing service in a strange hutch. Mating should occur almost immediately on placing the doe in the buck's hutch. After the buck mounts and falls over on his side, the mating is accomplished. Return the doe to her own hutch.

It is difficult to get some does to accept service. Restrain such does for mating. To restrain the doe (fig. 12), use the right hand to hold the ears and a fold of the skin over the shoulders; place the left hand under the body and between the hind legs. Place the thumb on the right side of the vulva, the index finger on the left side (you may prefer to use the index and second finger), and push the skin gently backward. This procedure throws the tail up over the back. Support the weight of the body by the left hand, and elevate the hindquarters only to the normal height for service.

Bucks accustomed to being handled will not object to such assistance. It is well to hold the doe in this way the first few times a young buck is used. This practice will expedite matings and insure ready service in difficult cases.

Does mate and conceive more readily in the spring than in the fall. For example, about 26 percent of the does at the United States Rabbit Experiment Station required restraint in the spring compared with 53 percent in the fall. Of the does that required restraint in the spring, more than 60 percent produced young; in the fall, 30 percent.

With a little patience and practice you can develop this technique to insure nearly 100-percent matings. This does not necessarily mean that all does will kindle. But the technique will help materially in increasing the kindling percentage, since more matings will occur.

Maintain one buck for each 10

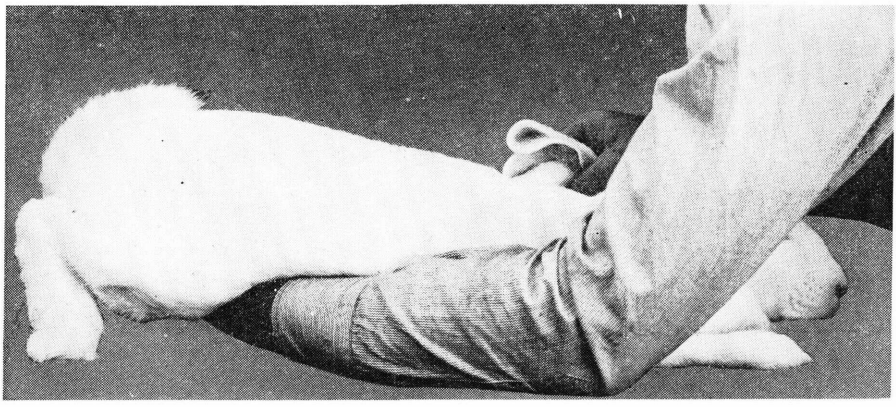

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***Figure 12.*—How to restrain a doe for mating when service is not promptly accepted. Shows position of hands for holding the doe and supporting and elevating the hindquarters.**

breeding does. You can use mature, vigorous bucks once or twice a day for a short period. Keep a breeding record showing date of mating and name or number of buck and doe. (See p. 39.)

Determining Pregnancy

It is not accurate to determine pregnancy by "testmating" (placing the doe in the buck's hutch periodically). Some does will accept service when pregnant and others will refuse service when they are not pregnant. Diagnosing pregnancy by noting the development of the abdominal region and gain in flesh also is not dependable until late in the period.

You can quickly and accurately determine pregnancy by palpating (p. 23), but you must handle the doe gently.

Kindling

Place a nest box (p. 13) in the hutch 27 days after the doe is mated.

Sometimes does fail to pull fur to cover their litter or they kindle the litter on the hutch floor and let them become chilled. If you discover the young in time, sometimes you can save them by warming, even if they appear lifeless. Arrange the bedding material to make a comfortable nest. The doe's fur is easily removed at kindling time, and you can pull enough from the doe's body to cover the litter in the nest.

A day or two before kindling, the doe usually consumes less food than normally. Do not disturb her, but make her as comfortable as possible. You may tempt her at that time with small quantities of green feed. This will have a beneficial effect on her digestive system.

Most litters are kindled at night. After kindling, the does may be restless. Do not disturb her until she has quieted down.

Complications at Kindling Time

Anterior, or breech, presentation of young at birth is normal. If the doe is in proper condition for kindling, complications are rare. Pregnancy, however, makes a heavy demand on the doe and lowers her vitality, making her more susceptible to disease. A few days before or several days following kindling, pneumonia may develop. If you are to treat pneumonia successfully, you must detect it early. The doe's head is held high and tilted backwards. Breathing is difficult.

Make the doe comfortable and add green feed to the ration if possible. For a 10- to 12-pound doe, inject 400,000 units of penicillin intramuscularly in the thigh. (A special type of penicillin is prepared for animals.) For lighter or heavier animals, adjust the dosage.[4]

Caked udder may be caused by the milk not being removed from the udder, or by injuries.

A day or two following kindling, inspect the udder to determine whether the litter is consuming the milk. Early symptoms of caked udder are firm, pink breasts that feel feverish to the touch. As caked udder develops, the tissues around the involved teats become enlarged and hard. The skin turns dark and the ends of the teats become discolored and tender. The doe refuses to allow the young to nurse.

Rub lanolin on the teats and massage the involved portion of the udder.

[4] See AH Correspondence Aid No. 23, "Common Diseases of Domestic Rabbits," U.S. Department of Agriculture.

You may restrain the doe to allow her own young or those from other litters to remove the milk. You also may strip the milk from the teats, taking care not to use too much pressure. Do not lance the tissues.

Mastitis, or "blue breast," is caused by bacterial infection and may be very contagious. The doe fails to consume her feed and is inactive. The udder is congested and feverish and turns red or purple. The teats are discolored.

Reduce feed, give some green feed, and inject penicillin intramuscularly in the thigh. (See treatment recommended for pneumonia.)

Care of Young Litter

On the day after kindling, inspect the litter. Quietly place the hand in the nest box and remove any deformed, undersized, or dead young. If you are careful and quiet in making the inspection, the doe generally will not object. There is no danger of causing her to disown the young. If she is nervous and irritable, place some tempting feed in the hutch immediately after the inspection to distract her attention and quiet her.

Litters vary in size. In the utility breeds, they usually number 8. Some may number 12 to 18. For commercial purposes, 6, 7, or 8 may be left with the doe. Does from strains that have been developed for heavy production may care for 9 or 10.

You can transfer some of the baby rabbits from a large litter to a foster mother that has a small litter. Adjusting the number of young to the capacity of the doe insures more uniform development and finish at weaning time. Mate several does so that they will kindle at about the same time. For best results, the young should not vary more than 3 or 4 days in age when transferred.

After the does have kindled and settled down, mark one or both ears of the surplus young in such a way that they can be identified at weaning. Rearrange the nesting material so each litter will be protected and comfortable. Some does will be inquisitive and jump into the nest box but they will not injure the young.

Young rabbits open their eyes 10 or 11 days after birth. They begin to come out of the nest box after 19 or 20 days and start taking food other than their mother's milk. If young rabbits come out of the nest box before 19 or 20 days, they may not be getting enough mother's milk. Also, the nest box may be too warm. The nest box should be constructed so the young will not fall out.

Eyes of baby rabbits occasionally remain closed after the age at which they normally open. Such a condition is caused by infection. If you discover the infection and treat it promptly, the animals usually recover without permanent eye injury. If the lids are inflamed and incrusted, bathe them with a tepid solution containing 4 percent of boric acid, applied with a wad of cotton. When the tissues are properly softened, you can separate the lids with slight pressure. If pus is present on succeeding days, treat the eyes with a fresh solution containing 10 percent of argyrol.

Causes of Losses in Newborn Litters

If the doe is disturbed, she may kindle on the hutch floor and the litter may die from exposure. Even if predators—cats, snakes, rats, weasels,

minks, bobcats, coyotes, strange dogs—cannot gain access to the rabbitry, if they are so close that the doe detects their presence, she may be frightened and kindle prematurely. If she is disturbed after the litter is born, she may jump into the nest box and stamp with her back feet. The stamping may mash the newborn rabbits.

Occasionally a doe fails to produce milk. The udder does not fill out. The young starve within 2 or 3 days.

Does sometimes eat their young. This results usually from a ration inadequate in either quality or quantity or from the nervousness of a doe disturbed after kindling. Proper feeding and handling during pregnancy will do more than anything else to prevent this tendency. Give another chance to a valuable doe that destroys her first litter; if she continues the practice sell her for meat.

Weaning the Litter

Good mothers nurse their litters 6 to 8 weeks. The young develop more rapidly if they are in the hutch with their mothers until they are 8 weeks of age. By that time, the milk supply will have decreased and the young will be accustomed to consuming other feed. Weaning will be less of a shock than if undertaken at an earlier age. Separate the sexes at weaning.

Determining Sex

It often is profitable to determine the sex of very young rabbits, particularly if you have a market for breeding or laboratory animals. It is possible to determine accurately the sex of a day-old rabbit but it is easier when the rabbit is 3 days old and easiest when it is 8 weeks old, or at weaning time. When it is desirable to dispose of one sex, however, it is a good plan to sex the litter and destroy the surplus on the third day.

The external sex organs of newborn rabbits have much the same appearance in both sexes. A special technique, good eyesight, and good light therefore are needed to identify the sex of newborn rabbits. To keep the small rabbit from wiggling, restrain it firmly, yet gently. Place it on its back in the left palm with its head extended toward the heel of the hand. Use the index finger to press the tail back and down, and the thumb of the left hand and index finger and thumb of the right hand to manipulate the sex parts. Press down on the sexual organ gently. Use enough pressure to expose the reddish mucous membrane. In the buck, the mucous membrane can be made to protrude far enough to form a circle; in the doe it will protrude and form a slit that will have a slight depression at the end next to the anus.

Marking for Identification

Mark each breeding rabbit for identification. Tattooing the ears is a satisfactory method. When properly done, it is permanent and will not disfigure the ears. You can obtain instruments for the purpose from biological and livestock supply houses. A good type of instrument has separate lugs, each bearing a letter or numeral. The lugs are inserted into a plierslike handle. Such an instrument perforates the inner surface of the ear in one operation. Rub india ink into the small holes. Ear tags and clips are not satisfactory because they tear out and disfigure the ear. Identification is then lost.

An adjustable box (fig. 13) is convenient for restraining rabbits for tat-

tooing. With this equipment, one person can do the job.

Castration

Castration of bucks may be desirable—for example, Angoras to be kept in colonies for wool production. Castration is a simple operation, most easily performed when bucks are 3 to 4 months old. You also can perform it at weaning time.

To restrain an animal for the operation, have an assistant hold the left forefoot and left hind foot with his left hand, and the right forefoot and right hind foot with his right hand, with the animal's back held firmly, but gently, against his lap. Clip all the wool from the scrotum. Disinfect a sharp knife or razor blade. If you do not use a disinfecting agent on the rabbit, he will lick the wound frequently, keeping it clean and the tissues soft, thus promoting healing.

Press one of the testicles down into the scrotum. Hold it firmly between the thumb and forefinger of left hand. Make the incision parallel to the median line and well toward the back end of the scrotum to allow the wound to drain readily. To prevent the testicle's being drawn up into the abdominal cavity, as soon as it comes through the incision, pull it out far enough from the body for the cord to be severed just above it. To prevent excessive hemorrhage, sever the cord by scraping with the knife rather than by cutting. If too much tension is put on the cord and it is drawn too far from the body, injury may be brought about by internal hemorrhage or other complication.

After the second testicle has been removed in the same manner, lift the scrotum to make sure that the ends of the cord go back into the cavity.

Handle the animal gently. After

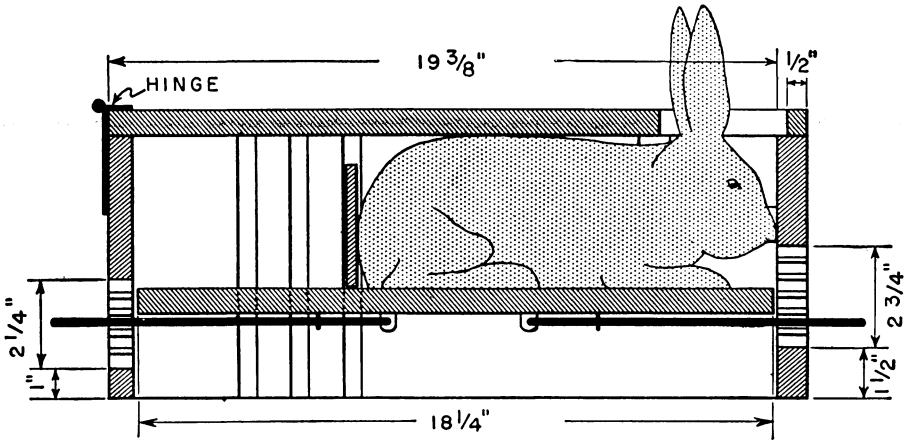

***Figure 13.*—Vertical section of a box for restraining a rabbit for tattooing. The spring-type holders tacked to the lower side of a movable floor compress the rabbit toward the top of the box. A movable cross partition holds the rabbit toward the front. Blocks of wood on each side hold the rabbit's head in the center of the hole at the top.**

the operation, place it in a clean hutch where it can be quiet and comfortable.

Long Toenails

The toenails of rabbits confined in hutches do not wear normally. They may even become long enough to cause foot deformity. The nails may also catch in the wire mesh floor and cause injury and suffering.

Periodically cut the nails with side-cutting pliers. Cut below the tip of the cone that can be observed by holding the foot up to daylight. This will not cause hemorrhaging or injury to the sensitive portion.

Care of Herd Under Extreme Temperatures

In almost all sections of the United States high summer temperatures necessitate some changes in the general care and management of rabbits. Provide adequate shade to protect the animals during the hotter part of the day, but do not place rabbits where they are totally excluded from sunlight during the cooler hours. Good circulation of air throughout the rabbitry is necessary, but avoid strong drafts. Provide an abundant supply of water at all times.

Newborn litters and does advanced in pregnancy are most susceptible to high temperatures. Heat suffering in the young is characterized by extreme restlessness; in older animals, by rapid respiration, excessive moisture around the mouth, and occasionally slight hemorrhages around the nostrils. Move rabbits that show symptoms of suffering from the heat to a quiet, well-ventilated place. Give them a feed sack moistened with cold water to lie on. Water crocks and large bottles filled with cracked ice and placed in the hutch so the rabbits can lie next to them contribute to the rabbits' comfort.

In well-ventilated rabbitries, wetting the tops of the hutches and the floors of the houses on a hot day will reduce the temperature 6° to 10° F. The tops of hutches should be waterproof, as rabbits must be kept dry. You can use overhead sprinkling equipment in houses with concrete or soil floors that drain readily. You can install a thermostat-controlled sprinkler that will work automatically.

During the summer, it sometimes is difficult to regulate the quantity of fur in the nest box to keep the litter comfortable. A cooling basket (fig. 14) then will provide relief for the young. It is useful from the time the young are kindled until their eyes are opened and they are able to look out for themselves. Make this basket 15 inches long, 6 inches wide, and 6 inches deep. Use ⅛-inch-mesh hardware cloth 15″ x 18″; 2 boards ¾″ x 6″ x 6″; 2 laths ⅜″ x 1½″ x 15″; and 2½-inch screwhooks.

Tack the hardware cloth to three edges of the two square boards. To keep the basket from bending, nail the two laths lengthwise, in front and back of the basket outside the wire. Nail the top edges of the laths flush with the tops of the end boards. At the back, insert two screw hooks in the end boards about 2 inches from the top, so you can hang up the basket.

When the temperature is high enough to make the young restless, place them in the basket. Hang up the basket inside the hutch near the top and leave it for the day. In the evening, if it is cooler, return the litter to the nest box. Where high temperatures continue throughout the night,

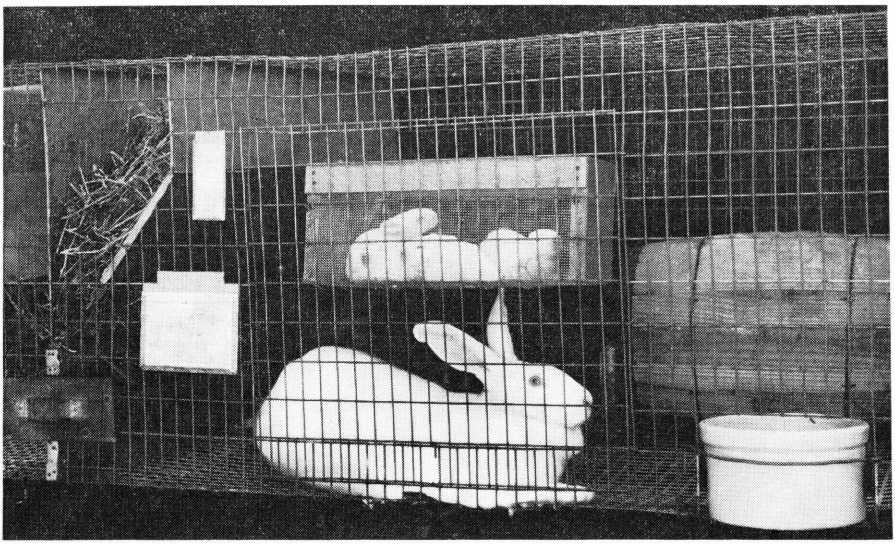

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***Figure 14.*—A cooling basket hung in the hutch to provide comfort for the young during hot weather.**

place the young in the nest box for a short time in the evening for nursing. Replace them in the basket for the night and allow them to nurse again in the morning.

Do not hang the basket in direct sunlight.

Mature rabbits, if kept out of drafts, suffer little from low temperatures. For young litters provide nest boxes and sufficient bedding to keep them warm.

Preventing Injuries

Paralyzed hindquarters in rabbits usually result from improper handling or from injuries caused by slipping in the hutch while exercising or attempting to escape predators. Such slipping usually occurs at night. Common injuries are dislocated vertebras, damaged nerve tissue, or strained muscles or tendons. If the injury is mild, the animal may recover in a few days. Make the injured animal comfortable and feed it a balanced ration. If it does not improve within a week, destroy it to prevent unnecessary suffering.

Preventing Sore Dewlaps

During warm weather the dewlap, or fold of skin under the rabbit's chin, may become sore. This is caused by drinking frequently from crocks and keeping the fur on the dewlap wet so long that it becomes foul and turns green. The skin on the dewlap and on the inside of the front legs becomes rough and the fur may be shed. The animal scratches the irritated area, causing abrasions and infection.

Remove the cause by placing a board or brick under the water crock to raise it so that the dewlap will not get wet when the rabbit drinks. If the skin has become infected, clip off the fur and treat the area with zinc oxide

ointment or other mild disinfectant every other day until the irritation clears up.

Sanitation and Disease Control

To protect the herd's health, keep rabbitry equipment sanitary. Remove manure, soiled bedding, and contaminated feed daily. Inspect water crocks and feed troughs daily and wash them frequently in hot, soapy water. Rinse them in clear water, and allow them to drain well. Place them in the direct rays of the sun to dry. If it is impracticable to sun the equipment properly, rinse it first in water to which a disinfectant has been added and then in clear water.

To prevent or control a disease or parasitic infection, thoroughly disinfect hutches and equipment with one of the coal-tar byproducts. Allow hutches and equipment to dry before returning rabbits to the hutches.

Clean and disinfect nest boxes before using them a second time.

Maintaining sanitary conditions in the rabbitry is a preventive measure for controlling disease in the herd. Be constantly alert for the appearance of any sign that might indicate disease. Isolate animals suspected of having disease at least 2 weeks to determine definitely whether they are dangerous to the health of the herd. Place newly acquired rabbits and those returned from shows in quarantine at least 2 weeks for the same reason. Burn or bury dead animals.

Using hutches with self-cleaning floors (fig. 2), guards on feed troughs (fig. 6), and feed hoppers (fig. 7) will aid greatly in internal parasite control by protecting feed from contamination.

Effective treatments are not known for many rabbit diseases. It is usually simpler and safer to destroy a few sick animals than it is to treat them and risk spreading infection to healthy stock. This is especially true of animals with respiratory infections. For specific information on rabbit diseases, write to the Agricultural Research Service, U. S. Department of Agriculture, Washington 25, D. C.

Fur-Eating Habit

Rabbits that eat their own fur or bedding material, or gnaw the fur on other rabbits, usually do so because the ration is inadequate in quality or quantity.

The experienced breeder notes the condition of each animal in the herd and regulates the quantity of feed to meet its individual requirement. Keeping good-quality hay before the rabbit and feeding fresh, sound green feed or root crops as a supplement to the grain or pelleted ration also helps to correct an abnormal appetite. Sometimes the protein content of the ration is too low. Adding more soybean, peanut, sesame, or linseed meal corrects the deficiency.

Preventing Wool Block

In cleaning themselves, rabbits lick their coats and swallow some wool or fur, which is not digested. In normal-coated breeds, the only noticeable result is that the droppings are fastened together by fur fibers. Angora wool, however, is long. If the rabbit swallows any appreciable amount, it collects in the stomach and forms a "wool block" that interferes with digestion.

If it becomes large enough, it blocks the alimentary tract and the animal starves. The most satisfactory method of preventing this is to shear regularly—every 10 to 12 weeks.

Gnawing Wooden Parts of Hutch

Gnawing wood is natural for the rabbit. Protect wooden parts of the hutch by placing wire mesh on the inside of the frame when constructing the hutch and by using strips of tin for protecting exposed wooden edges. Treating the wood with creosote protects it as long as the scent and taste last. Placing twigs or pieces of soft wood in the hutch protects it to some extent; rabbits may chew these instead of the hutch.

Rabbits that have access to good-quality hay and are receiving some fresh green feed or root crops are less likely to gnaw on their hutches.

Disposal of Rabbit Manure

Rabbit manure has a high nitrogen content when the rabbits are fed a well-balanced ration. It will not burn lawns or plants. It is easy to incorporate in the soil. It is satisfactory on gardens and lawns and about flowering plants, shrubbery, and trees. There is no danger in using it for fertilizing soil on which crops are to be raised for feeding rabbits.

The value of rabbit manure depends on how it is cared for and used. There will be less loss of fertilizing elements if the material is immediately incorporated into the soil. When manure is stored in piles and exposed to the weather, chemicals are lost through leaching and heat. Much of this loss can be prevented by keeping the manure in a compost heap or in a bin or pit.

Earthworms

Where earthworms are active throughout the year, as in warm climates, they may be used to advantage under rabbit hutches to save labor in removing the fertilizer. Make bins for confining the worms the same length and width as the hutch and 1 foot deep. Place them on the ground, not on solid floors, and keep the fertilizer moist to insure the worms' working throughout the bin.

Earthworms convert the rabbit droppings into casts—a convenient form of fertilizer for use with flowers, lawns, shrubs, trees, and other foliage. If you keep a large population of worms, there will be no objectionable odor. Very few flies will breed in it. It is necessary to remove it only at 5- to 6-month intervals.

Records and Record Keeping

A convenient and simple system of records is essential for keeping track of breeding, kindling, and weaning operations. You can use the information in culling unproductive animals and in selecting breeding stock. The essential features of a simple record system are illustrated in the hutch card and the buck-breeding record card shown in figures 15 and 16.

The Government does not furnish record cards to private parties. They may be obtained from firms dealing in supplies for the rabbitry. Some feed mills also furnish their customers with hutch cards.

HUTCH CARD

Animal No. W 301 Born 12/12/55 Breed New Zealand White

Sire W 394- Dam W 604 Litter No. W 714

DATE BRED	BUCK NO.	DATE KINDLED	NUMBER YOUNG BORN		NUMBER YOUNG RETAINED	LITTER NO.	DATE WEANED	NUMBER WEANED
			ALIVE	DEAD				
6/1/56	W418-	7/2	11	0	8	W19	8/27	8
8/24/56	W418-	9/24	9	0	8	W175	11/19	8
11/16/56	W418-	Passed	11/30					
11/30/56	W421-	12/30	9	1	8	W316	2/24/57	8
2/21/57	W421-	3/24	11	0	8	W465	5/19	7
(A)								

PRODUCTION RECORD

LITTER NO.	WEANING		
	NUMBER	AGE	WEIGHT
W19	8	56	30.2
W175	8	56	31.0
Passed	11/30		
W316	8	56	32.0
W465	7	56	28.0
(B)			

NOTES:

BN—7013

Figure 15.—**Hutch card, a useful form of record. *A*, Front. *B*, Back.**

BUCK BREEDING RECORD

Buck No. _____

Breed _____ Sire _____

Date born _____ Dam _____

Doe	Location	Date Bred	Result of breeding			Weaned	
			Kindled		Passed		
			Alive	Dead	Date	Number	Weight

BN—7014

Figure 16.—**Sample of a buck breeding record.**

COMMERCIAL PRODUCTION

If you want a large income from your commercial herd, you must be able to care for a large number of rabbits. Your returns will be in direct ratio to the number and quality of does maintained.

Formerly, about 10 man-hours each year were required to care for a doe and her 4 litters. With improved hutch and feeding equipment, rations designed to save labor in feeding, palpation of does, and other herd management practices, the number of man-hours has been greatly reduced. It now is possible for a breeder to care for twice as many does in the same length of time with less effort.

Fryer Production

Rabbits raised for meat and fur usually are marketed when they reach fryer weight even though the pelts are not prime. It usually does not pay to hold the animals until the pelts are prime.

Fryer rabbits weigh from 4 to 4¾ pounds when weaned at 2 months. They are ready for market and will yield a carcass (including liver and heart) of 50 to 59 percent of the live weight, 78 to 80 percent of which is edible.

For fryer production, mediumweight to heavyweight breeds are preferred. They develop to the desired weight and finish by the time they are 2 months old.

A pound of marketable fryer rabbit will require 2½ to 3½ pounds of total feed, from mating of the doe to marketing of the young when 2 months old. Good does nurse their litters 6 to 8 weeks. Young that are weaned and held for several days before marketing may either fail to gain or actually lose weight. Leave the young with their mothers until they go to market. If you want to produce fryers heavier than those weaned when 56 days old, keep young rabbits with their mother an additional 8 or 9 days. These fryers should gain an average of $^{6}/_{10}$ pound during this period if full fed a balanced ration. They will require 5¼ pounds of feed per pound of increase in live weight.

Roaster Production

You can fatten culls from the breeding herd for roasters, if they are in good condition. In some areas you may find it profitable to develop young rabbits to heavier weights primarily for the meat market. Such rabbits should yield a carcass that is 55 to 65 percent of the live weight, with 87 to 90 percent of it edible.

The quantity of feed required to produce a pound, live weight, increases with each pound of gain. About 5½ pounds of feed are required to increase the live weight of does and bucks from 6 to 7 pounds; 8 pounds for an increase from 7 to 8 pounds; 11½ pounds for an increase from 8 to 9 pounds; and 14 pounds for an increase from 9 to 10 pounds.

Castrated bucks require less time and about 5 percent less feed than bucks to attain a given live weight. If a buck is castrated when 2 months old, his skin at maturity will grade as a doe skin and sell for a higher price. These factors, however, usually do not justify the extra work and danger involved in castration. One advantage of castration is that a number of animals can be kept together and equipment, time, and labor saved.

In full-fed rabbits weighing 4 to 12 pounds (live), the poorest skins come from 7- to 9-pound animals up to 134 days old. Older animals produce a higher percentage of better-grade skins.[5]

Whether it will pay to grow or condition heavier rabbits for the market depends on the relative cost of feed and the market value of the finished product.

Angora Rabbit Wool Production

Angora rabbit raising for wool is a comparatively new phase of the rabbit industry. Wool on Angoras reaches a length of 2½ to 3½ inches each quarter. You can shear about 14 ounces of wool a year from a mature Angora that is not nursing young. This wool is valued for its softness, warmth, and strength. It is used in the manufacture of children's clothing, sport clothes, garment trimmings, and clothes for general wear.

There are two types of Angora rabbits—the English and the French. They are difficult to distinguish one from the other when they are off type and the choice largely is a matter of personal preference. The typical French Angora usually is larger than the English; the wool fiber of the French is shorter and coarser than that of the English.

Feed and care for Angoras in the same ways as other breeds. Because of wool covering, however, you must handle Angoras to determine how much flesh they are carrying—feel the amount of flesh along the backbone. Reduce or increase the quantity of feed to keep animals in condition.

A properly constructed manger for hay and green feed protects the wool from foreign matter and prevents contamination of feed.

Keep herd bucks and does in individual hutches. Keep woolers—does and castrated bucks maintained primarily for wool production—in groups or colonies to save labor.

To prevent infestation with internal parasites and to keep the wool clean, install self-cleaning floors in the pens.

Castration of bucks that are to be reserved for woolers will reduce fighting in the herd.

EQUIPMENT FOR GROOMING AND SHEARING.—You will need the following equipment for grooming and shearing:

A table, waist high, with a 12- by 24-inch top covered with carpet or a feed sack to keep the rabbit from slipping, and equipped with castors to allow easy turning.

A hairbrush with single steel bristles set in rubber, for brushing and removing foreign material from wool.

A pair of barber's scissors or electric clippers.

A ruler for measuring the length of wool.

Containers for storing wool.

GROOMING.—Commercial woolers require little, if any, grooming between shearings provided they are properly cared for and sheared every 10 to 12 weeks. If you allow the coat to grow for a longer period, the fibers may become webbed, tangled, or matted.

For grooming, place the rabbit on the table. Part the wool down the middle of the back. Brush one side, stroking downward. As you reach the end of the wool, brush upward and

[5] Further information is contained in Circular 789, Effect of Various Factors on Grades of New Zealand White Rabbitskins, U. S. Department of Agriculture. Out of print; available in libraries in most cities.

outward to remove all foreign material. Make another part in the wool about half an inch farther down the side. Repeat the operation until the job is completed. Groom the other side the same way.

For grooming the head, front legs, and belly, place the rabbit on its back in your lap. Hold its hindquarters gently but firmly between the knees. Separate small areas of wool and groom the way you did the sides.

For grooming the hind legs, place the rabbit on its back in your lap. Hold the head and front feet under the left arm. Use the left hand to hold the rabbit's hind legs.

SHEARING.—Before shearing, cut off all stained ends of wool.

Shear or pluck rabbits when 8 weeks old and every 10 to 12 weeks thereafter. Handle them gently and quietly.

Place the back of the scissors against the rabbit's body to prevent cutting the skin. Begin at the rump and shear a strip about an inch wide to the neck. Repeat this operation until you have removed all the wool from one side. Turn the rabbit around and repeat the shearing operation on the other side, starting at the neck and shearing toward the rump.

For shearing the head, front legs, belly, and hind legs, restrain the rabbit as for grooming. Do not injure the doe's teats. Do not shear wool from the belly of a pregnant doe.

After shearing, lightly brush the rabbit to straighten out the wool fibers and prevent the formation of mats.

During cold weather, newly sheared rabbits need protection. A nest box in the hutch affords adequate protection during cool spells. When the temperature is as low as 30° to 40° F., keep the animals in a building where you can maintain comfortable temperatures. In winter, leave a half inch of wool on the body for protection.

GRADING, PREPARING, AND MARKETING WOOL.—Label a container for each grade of wool and place it near the shearing table. Grade the wool as sheared. Following are the usual commercial grades:

Plucked No. 1.—Pure white, absolutely clean, free of all mats and foreign matter; staple length, 3 inches or longer.

Plucked No. 2.—Pure white, absolutely clean, free of all mats and foreign matter; staple length, 2 to 3 inches.

Super Wool Cut.—Pure white, absolutely clean, free of all mats and foreign matter; staple length, 3¼ inches and over.

No. 1.—Pure white, absolutely clean, free of all mats and foreign matter; staple length, 2¼ to 3 inches.

No. 2.—Pure white, absolutely clean, free of all mats and foreign matter; staple length, 1½ to 2 inches.

No. 3.—Pure white, absolutely clean, free of all mats and foreign matter; staple length, 1 to 1½ inches.

Shorts.—Pure white and absolutely clean, but may be slightly webbed; ½ to ¾ inch.

No. 4.—Pure white, clean, matted.

No. 5.—Stained and unclean wool, matted or unmatted.

Put each grade in a separate paper bag. A bag about 12 inches high will hold a pound of wool without packing too tightly. Tie the bags and place them in burlap sacks or corrugated boxes for shipment.

If the wool is to be stored, place it in a tightly covered container. To protect the wool from moths, put mothballs or crystals in a small sack and in the container with the wool.

Some Angora breeders spin the wool on an old-fashioned spinning wheel and knit the yarn into garments for home use or for sale. Others sell wool to organizations or individuals who collect quantities large enough to sell to mills.

PREPARING AND MARKETING PRODUCTS

Crating and Shipping Live Rabbits

You can ship rabbits almost any distance with safety, if they are in good condition, properly crated, and provided with food and water. Do not ship them in extremely hot or cold weather. Always use well-ventilated crates that are long enough to permit the rabbit to lie down. Use straw, not sawdust, for bedding. Crates with slanting tops discourage stacking.

Put only one animal in a compartment of a shipping crate. Animals to be in transit 24 hours or less need only a small quantity of feed and water. If the trip is long, more feed and water are needed. Attach to each crate a bag of feed and a printed request to feed and water the animals once daily. Plenty of fresh water and feed should be accessible to the rabbits at all times. Use the type of feed given in the rabbitry for rabbits in transit.

Label the crate clearly, advising against exposing the animals to sun or rain and also against placing the crates near steam pipes. Notify the purchaser when rabbits are shipped.

You can make shipping crates from packing boxes. It is good business, however, and effective advertising, to ship rabbits in durable crates that are neatly built, light in weight, and attractive. Furnish ample space in each compartment and see to it that wire netting keeps the rabbits from gnawing the wood.

No permit is required for importing domestic rabbits but there is a duty, details of which may be obtained from the Bureau of Customs, U. S. Department of the Treasury, Washington 25, D. C.

Slaughtering and Skinning

Slaughter a rabbit by dislocating the neck. Hold the animal by its hind legs with the left hand. Place the thumb of the right hand on the neck just back of the ears, with the four fingers extended under the chin (fig. 17). Push down on the neck with the right hand, stretching the animal. Press down with the thumb. Then raise the animal's head by a quick movement and dislocate the neck. The animal becomes unconscious and ceases struggling.

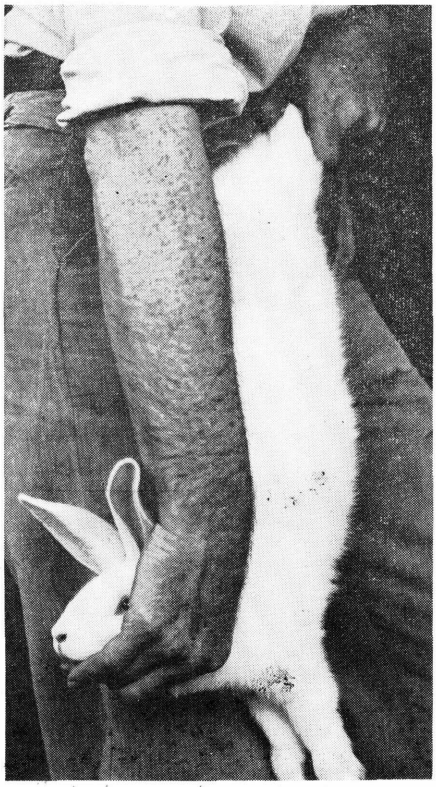

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***Figure 17.*—How to hold a rabbit for dislocating neck in slaughtering.**

Another method is to hold the animal with one hand at the small of the back, with its head down, and stun it by a heavy blow at base of the skull.

Slaughter in clean, sanitary quarters. Obtain information on regulations and restrictions from local health authorities.

Suspend the carcass on a hook inserted between the tendon and the bone of the right hind leg just above the hock. Remove the head immediately to permit thorough bleeding so the meat will have a good color. Remove the tail and the free rear leg at the hock joint, and cut off the front feet. Then cut the skin just below the hock of the suspended leg and open it on the inside of the leg to the root of the tail, continuing the incision to the hock of the left leg. Carefully separate the edges of the skin from the carcass, taking special pains to leave all fat on the carcass as the skin is pulled down over the animal. This makes a more attractive meat product, facilitates drying the skin, and prevents "fat burns" on the pelt in drying (fig. 18).

When a skin is left entire it is known as a cased skin.

Even small cuts lessen the value of a skin. As soon as you remove the skin, place it on a stretcher, secure it, and hang it up for drying (fig. 19).

After skinning the carcass, make a slit along the median line of the belly and remove the entrails and gall bladder. Leave the liver and kidneys in place. Remove the right hind foot by severing at the hock. Take particular care not to get hairs on the carcass; they are difficult to remove and detract from the appearance. Rinsing

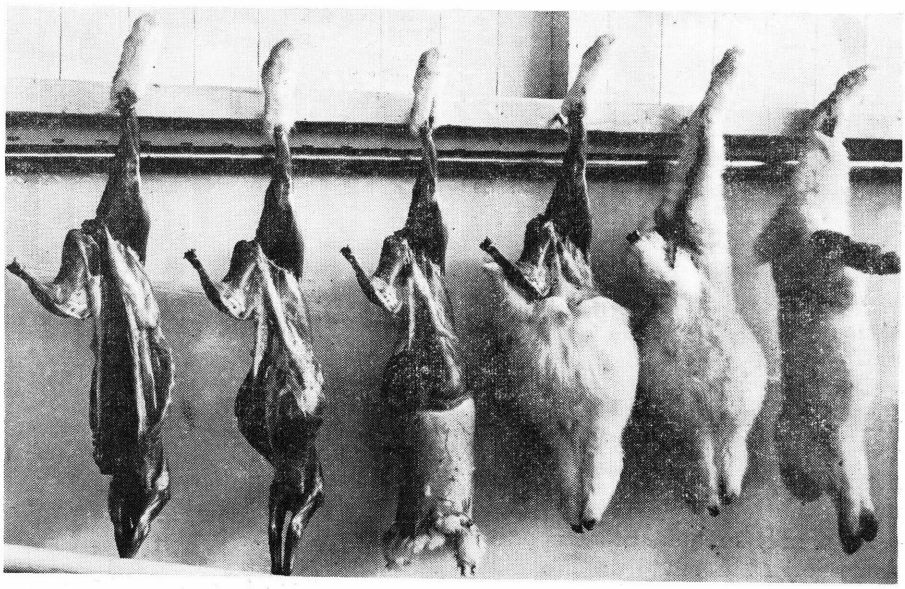

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***Figure 18.*—Steps (right to left) in skinning rabbits and removing internal organs. Small jets of water from pipe beneath rack wash blood from back panel and trough.**

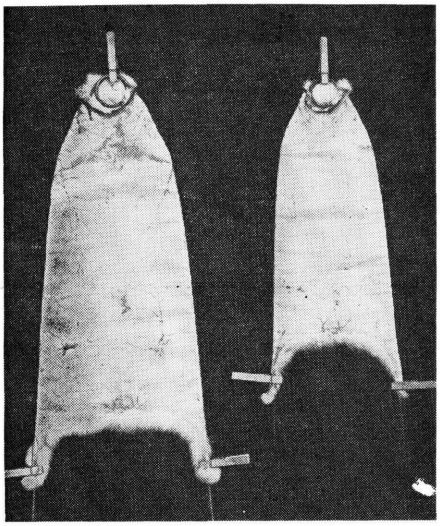

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***Figure 19.*—How to place a rabbit pelt on a shaper, or stretcher, with all the legs on the same side.**

the carcass in cold water facilitates removal of hair and blood and also cleans the carcass. Brush the rabbit's neck thoroughly in water to remove the blood. Do not leave the carcass in water more than 15 minutes; prolonged soaking causes it to absorb water, and water in the meat is considered adulteration.

Chill the carcass in a refrigerated cooler. Arrange the carcass on a cooling rack so that moderate air movements and a suitable temperature within the cooler will reduce the internal temperature of the carcass to no less than 36° F. and to no more than 40° F. within 24 hours.

Hanging by the hind legs for chilling may cause a carcass to be drawn out of shape, so that the pieces will not fit satisfactorily into a carton. Some processors chill carcasses in wire trays, arranging them so the pieces will be of a proper shape for packaging.

Cutting Up and Packaging Rabbit Meat

Hotels, restaurants, hospitals, clubs, and other establishments usually purchase the whole carcass. Their chefs prefer to cut them to meet their own requirements. Housewives usually prefer the cut-up, packaged product. Cut up the fryer rabbit with a knife; using a cleaver may splinter the bones. In large commercial processing plants, a band saw is used.

A paraffined box with a cellophane window makes a neat, sanitary package for the chilled rabbit carcass. If the package is to be handled considerably or the meat is to be frozen, use a box without the cellophane window, but wrap the meat or the box in a special sealable wrapping to prevent freezer burns and loss in palatability.

A box 9 inches long, 4 inches wide, and 2½ inches deep is suitable for a fryer carcass weighing 1¾ to 2¼ pounds. Arrange the cuts attractively. Include the heart, kidneys, and liver.

If you sell to the home trade or furnish butchers with meat that is to be consumed locally, you can make a neat, sanitary, and inexpensive package by arranging the pieces of fryer and a sprig of parsley on a paper plate and covering with a piece of clear cellophane.

For information on regulations governing the grading and inspection of domestic rabbits and specifications for classes, standards, and grades, write to the Agricultural Marketing Service, U. S. Department of Agriculture, Washington 25, D. C.

RABBITSKINS

Curing

While still warm, place skins to be cured flesh side out (with the fore part over the narrow end) on wire or board formers or shapers. Take care to remove all wrinkles. You can make a satisfactory skin shaper from 5 feet of No. 9 galvanized wire. This equipment has been called a "stretcher," but the term may give a wrong impression. It is not desirable to stretch the skin unduly. Mount a skin on the shaper with the legs on the same side. This arrangement lessens injury to the back fur, which is the most valuable (fig. 19). On the day after skinning, examine the pelts to see that the edges are drying flat, that the skin of the front legs is straightened out, and that any patches of fat are removed.

All skins must be thoroughly dried before you pack them, but do not dry them in the sun or by artificial heat. Hang them up so the air can circulate freely about them. If you will not ship the dried skins for some time, hang them in loose bundles of 50 in a cool, dry place away from rats and mice. In the summer or in a warm climate, sprinkle the stored skins with naphtha flakes. Never use salt in curing rabbitskins.

Marketing

Domestic rabbitskins vary greatly in density and quality, depending on the degree of care that breeders take in making matings. Good fur can be produced on efficient meat-producing animals by selective mating. Better skins command higher prices.

All rabbitskins have some value in the fur trade. About 85 percent of domestic rabbitskins are from rabbits 8 to 10 weeks old. These skins are known in the trade as "fryer skins." They usually are sold by the pound as butcher run—i. e., ungraded. Five or six of them usually weigh a pound. The better-grade skins from older domestic rabbits usually are sold by the piece, primarily because they are larger than fryer skins.

Because of the relative cheapness of rabbitskins, volume is necessary for the dealer to market them satisfactorily; and since dressing charges are so much per skin, the larger skins, other things being equal, will bring the better price even when they are sold by the pound. In areas where similar skins are produced in quantity, it might be profitable for several rabbit raisers to market their skins cooperatively.

White skins bring nearly twice the price of colored skins because of adaptability to use in the lighter shades of garments and hats.

If good and poor skins of different sizes and colors are mixed in a shipment, the entire shipment is usually accepted at the price of poor skins. Sort the skins (unless you have too few) and offer them in separate shipments.

Grades

Raw-fur buyers usually grade rabbitskins as firsts, seconds, thirds, and hatters. Many buyers have their special grades. Firsts and seconds may be divided into five color classes—white, red, blue, chinchilla, and mixed. Some furriers also grade firsts and seconds as large, medium, and small. If

you have enough skins, pack white, red, blue, and chinchilla skins separately by colors. Put skins of all other colors together.

Firsts are prime pelts that are large, properly shaped, and properly dried (fig. 20). All the hair and underfur are intact, and the skin side is free from fat, flesh, spots, streaks, and cuts. The thicker and denser the underfur, the more valuable is a pelt and the better price it will bring.

Firsts are used for making garments. They may be sheared or used in the natural or long-haired condition. They also may be used in the natural color or may be dyed. A uniform, dense underfur is necessary to make desirable rabbitskin garments. The coarse, longer hair should flow back in place when stroked toward the head of the rabbit.

Fryer skins contain a small percentage of fur usable for garments primarily because of shedding or molting marks and secondarily because of thin fur and leather. Rabbitskins for fur garments have been in bad repute because inferior grades have been used.

Seconds are pelts that have shorter fur and less underfur than firsts. The colored skin usually shows dark spots or streaks and, sometimes, large black splotches. These markings do not show often on white skins. Seconds also include pelts that are improperly shaped and dried, have been damaged in shipment, or show poor spots where

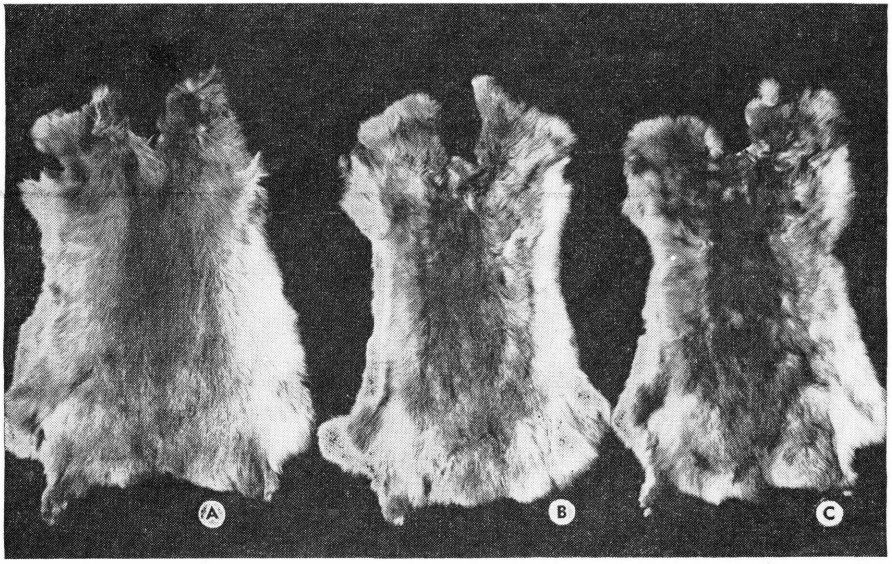

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***Figure 20.*—Skins dressed "long hair" from New Zealand Red rabbits. These skins have been rubbed from tail to head to raise the fur. *A*, Fully prime skin. *B*, Prime skin on the back only. *C*, Skin with all areas unprime. The rough sides of *B* and *C* indicate unprimeness because of shedding or molting.**

the skin has been pierced or the fur is short or missing.

Thirds are pelts with short fur and thin underfur and those from animals too young or those that are shedding. Thirds are of no value to furriers. They are used in the manufacture of toys, specialty articles, and felt hats.

All skins that do not meet requirements of the other grades are hatters. Pelts that are badly cut or otherwise mutilated, or poorly stretched and dried, are classed as hatters.

The underfur is used in making felt hats. Since the denser skins yield more "cut fur," the hat trade pays more for them.

The distribution of domestic rabbitskins into these several grades depends on the demand for each kind. The market may be such that practically all the rabbitskins at a given time will be sold as hatters. Under some conditions there may be but little demand even in the hat trade.

Packing and Shipping

To avoid spoilage or damage in transit, take care in packing skins for shipment.

So far as possible keep skins in the same shape as when removed from the form. Carefully examine each one to make sure that it is properly dried. Do not pack or ship a moist pelt or one that has patches of oily fat on it. Make up large quantities of skins into bales. Sprinkle flaked naphthalene or paradichlorobenzene on every 2 or 3 layers of skins, as you pack them. This will keep out insects that might cause damage. When a bale has been made up, cover with burlap, sew with strong cord or binder twine, and mark. Always protect skins when shipping them. Ship smaller quantities in gunny or feed sacks. Do not use wooden boxes for shipping rabbitskins; the weight adds materially to shipping charges.

Growth Through Agricultural Progress

U. S. GOVERNMENT PRINTING OFFICE: 1961